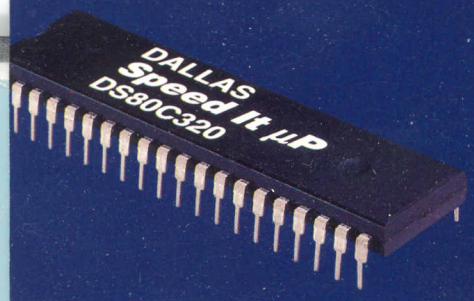
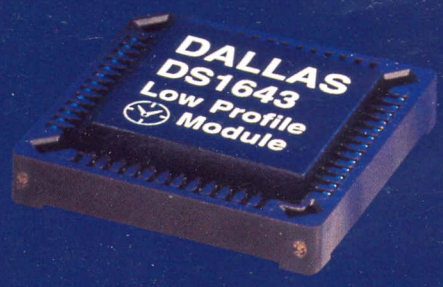
SHORT-FORM CATALOG

DALLAS SEMICONDUCTOR





APRIL 1996

http://www.dalsemi.com

For the latest information about every product we make, visit our World Wide Web site. You'll find the most complete, up-to-date information about our products available seven days a week, 24 hours a day. Here's just some of what you'll find:

- Complete Data Sheets for All Dallas Semiconductor Products Available in Adobe Acrobat™, PostScript™, and HTML Formats
- Application Notes
- New Product Announcements
- Technical Support
- Overviews of All Product Families
- Up-to-date List of World-wide Sales Offices
- Employment Opportunities
- How to Use Our Credit Card Sales Service

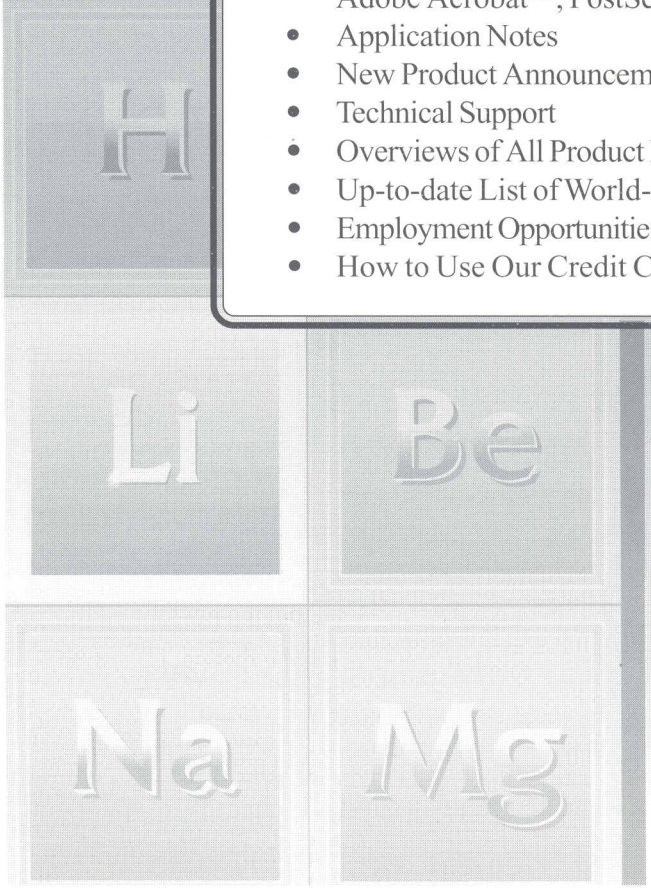
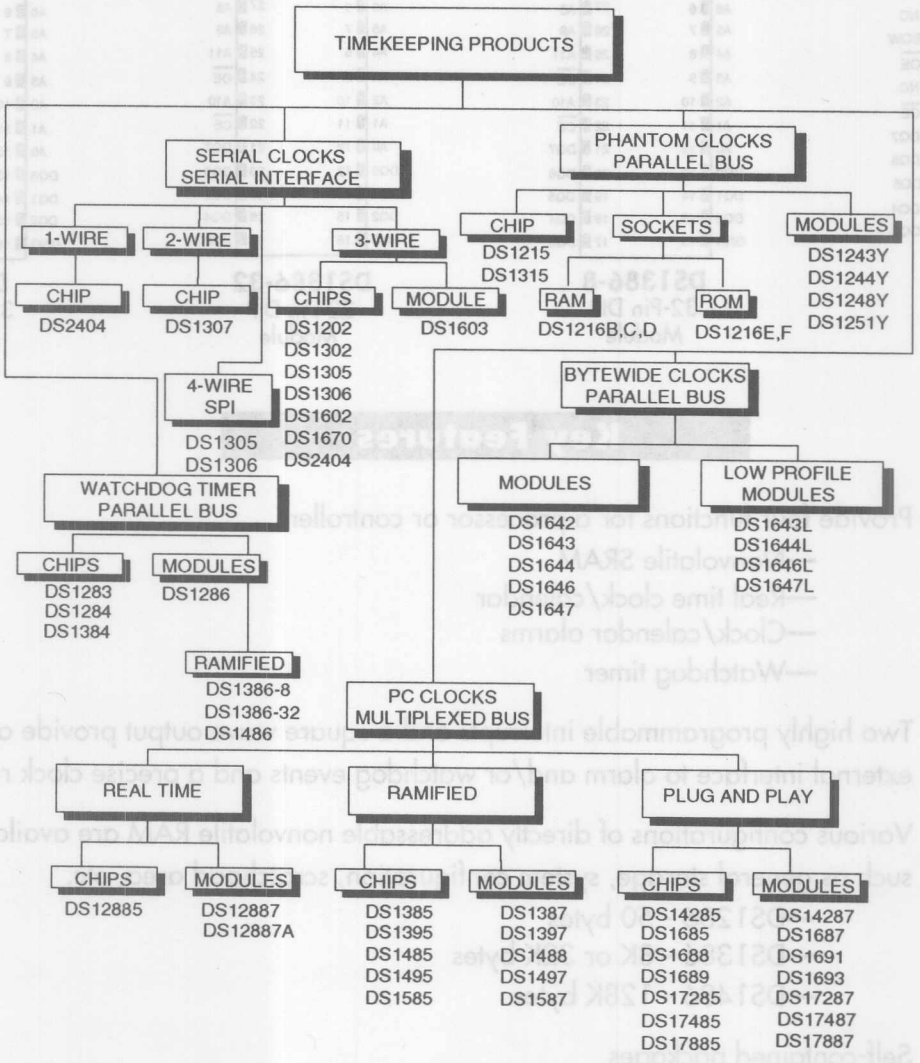


Table of Contents

Timekeeping Products

Dallas Semiconductor has been the leader in providing Real Time Clocks for a broad range of applications since 1985. The company's proprietary timekeeping CMOS circuits consume current at the nano-ampere level during periods of inactivity. As a result, they can be powered by a lithium cell for more than 10 years, longer than the useful life of most equipment. Because of this longevity, equipment manufacturers do not have to design provisions for battery replacement into their products. In addition to modules that combine circuits with lithium and quartz, Dallas Semiconductor offers timekeeping chips.



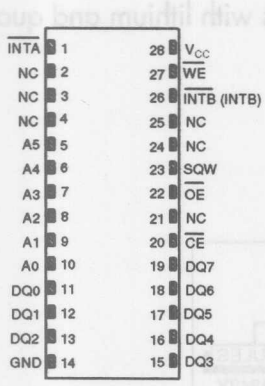
Applications

- Computers
- Data communication systems
- Medical equipment
- Plug and Play PCs
- Cellular phones
- Fax machines
- Industrial controllers
- Security systems
- Hand-held GPS receivers

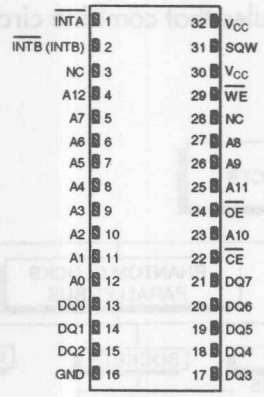
Featured Products

Watchdog Timekeeping Modules

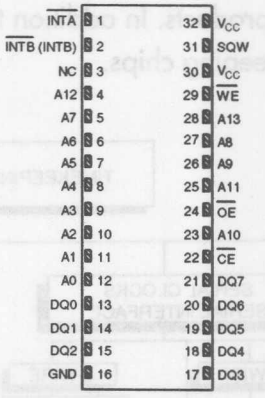
Various configurations of directly addressable nonvolatile RAM are available.



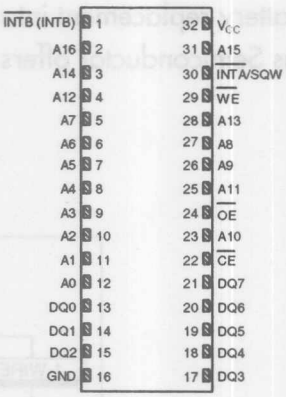
DS1286
28-Pin DIP
Module



DS1386-8
32-Pin DIP
Module



DS1386-32
32-Pin DIP
Module



DS1486
32-Pin DIP
Module

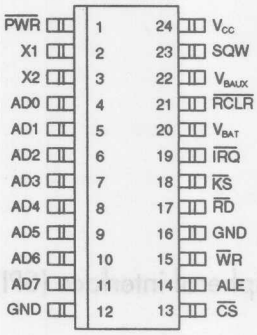
Key Features

- Provide four functions for a processor or controller:
  - —Nonvolatile SRAM
  - —Real time clock/calendar
  - —Clock/calendar alarms
  - —Watchdog timer
- Two highly programmable interrupts and a square wave output provide an external interface to alarm and/or watchdog events and a precise clock reference
- Various configurations of directly addressable nonvolatile RAM are available for uses such as general storage, system configuration, scratchpad area, etc.
  - —DS1286 - 50 bytes
  - —DS1386 - 8K or 32K bytes
  - —DS1486 - 128K bytes
- Self-contained packages
- Eliminate the need for any additional external components
- Maintain timekeeping and memory in the absence of system power for a minimum of 10 years with an accuracy of ±1 minute/month at 25°C
- Interrupt outputs active during battery back mode

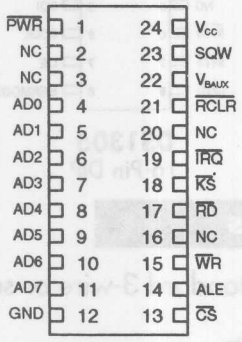
Featured Products

3V/5V Plug and Play Real Time Clocks

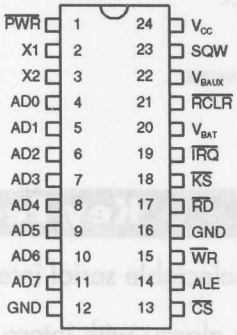
These clocks incorporate the industry-standard DS1285/DS1287 PC clock plus additional features.



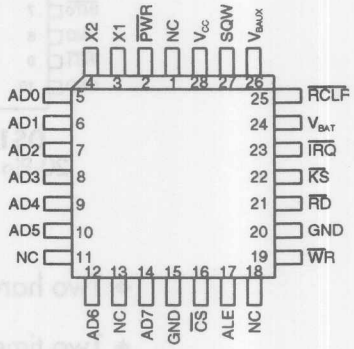
24-Pin SOIC



24-Pin Encap. DIP



24-Pin DIP



28-Pin PLCC

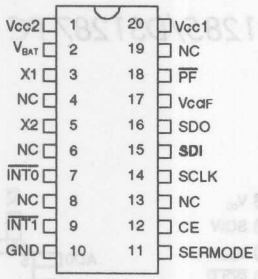
*Call factory for PLCC availability for DS17x8x parts.

Key Features

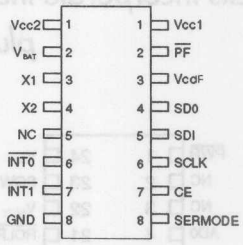
- 64-bit silicon serial number
- 114 bytes of user RAM
- Additional extended general-purpose RAM:
  - —128 bytes (DS1685, DS1687)
  - —2K bytes (DS17285, DS17287)
  - —4K bytes (DS17485, DS17487)
  - —8K bytes (DS17885, DS17887)
- Burst mode feature available when accessing the extended RAM (DS17x8x devices only)
- Century counter and date alarm
- Power control circuitry supports system power-on from a date/time alarm or a key closure
- +3V or +5V operation
- Available as chip (DS1685, DS17285, DS17485, DS17885) or standalone module with embedded battery and 32.768 kHz crystal (DS1687, DS17287, DS17487, DS17887)
- Provides an easy upgrade path for systems requiring more memory without any hardware modifications
- Pin configuration closely matches the DS12885/DS12887
- Outputs a 32 kHz square wave signal each time system power is applied and is an ideal device for systems with processors requiring a clock at power-up

Featured Products

DS1305 Serial Alarm Time Chip



DS1305
20-Pin TSSOP

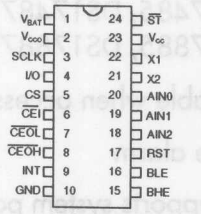


DS1305
16-Pin DIP

Key Features

- Two hardware-selectable serial interfaces: standard 3-wire or serial peripheral interface (SPI)
- Two time-of-day alarms with interrupt outputs
- Multiple power supply options supporting rechargeable backup power sources
- Interface logic power supply input for mixed 3V, 5V supply system capability
- 2.0V to 5.5V operation
- Standard clock/calendar functions along with 96 bytes of user NV SRAM

DS1670 Portable System Controller



DS1670
20-pin TSSOP
20-pin TSSOP

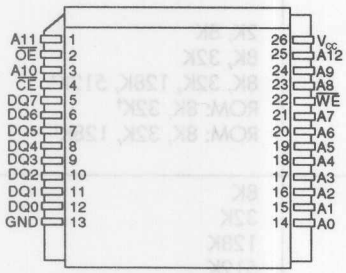
Key Features

- Low-power, highly integrated device ideal for hand-held portable products
- Standard clock/calendar function with standard 3-wire interface
- CPU monitor functions including power-on reset and watchdog timer
- Contains a 3-channel multiplexed 8-bit A/D converter with 10ms conversion time
- Time-of-day alarm with interrupt output
- Performs nonvolatile backup control to external SRAM
- 3V operation

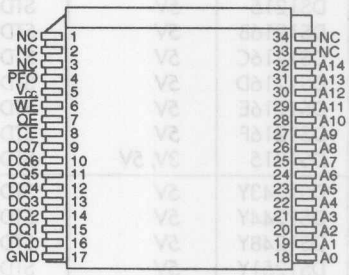
Featured Products

NV Timekeeping RAM Low Profile Modules

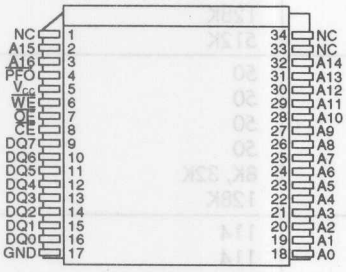
These Timekeeping RAM Modules provide identical functions and performance to their dual-in-line packaged counterparts. The low-profile module is a PLCC package which, when combined with a low-cost, surface mountable socket, provides a surface mount solution option to the NV Timekeeping RAM product family.



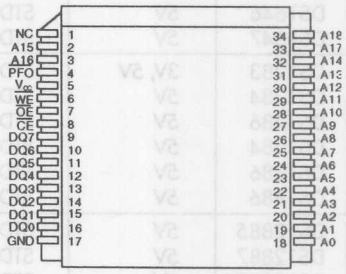
DS1643L
26-Pin Low Profile Module



DS1644L
34-Pin Low Profile Module



DS1646L
34-Pin Low Profile Module



DS1647L
34-Pin Low Profile Module

Key Features

- Integrate a real time clock function with various configurations of nonvolatile SRAM
- Self-contained packages include NV SRAM, real time clock, crystal, power control circuit, and lithium energy source
- Directly addressable bytewide RAM and BCD formatted timekeeping registers
- Allow for a simple hardware/software device interface design
- Require no additional external components
- Maintain timekeeping and memory in the absence of system power for a minimum period of 10 years with an accuracy of ±1 minute/month at 25°C

Selection Table

	Device Number	Power Options	Clock Format[1]	Calendar Format[2]	User RAM (Bytes)
Serial Clocks	DS1202	3V, 5V	STD	STD	24
	DS1302	2V, 3V, 5V	STD	STD	31
	DS1305	2V, 3V, 5V	STD	STD	96
	DS1306	2V, 3V, 5V	STD	STD	96
	DS1307	5V	STD	STD	56
	DS1602	5V	BINARY	BINARY	
	DS1603	5V	BINARY	BINARY	
	DS1608	3V, 5V	BINARY	BINARY	512
	DS1670	3V	STD	STD	
	DS2404	3V, 5V	BINARY	BINARY	512
Phantom Clocks	DS1215	5V	STD+hh	STD	
	DS1216B	5V	STD+hh	STD	2K, 8K
	DS1216C	5V	STD+hh	STD	8K, 32K
	DS1216D	5V	STD+hh	STD	8K, 32K, 128K, 512K†
	DS1216E	5V	STD+hh	STD	ROM: 8K, 32K†
	DS1216F	5V	STD+hh	STD	ROM: 8K, 32K, 128K†
	DS1315	3V, 5V	STD+hh	STD	
NV SRAM with Phantom Clock	DS1243Y	5V	STD+hh	STD	8K
	DS1244Y	5V	STD+hh	STD	32K
	DS1248Y	5V	STD+hh	STD	128K
	DS1251Y	5V	STD+hh	STD	512K
Timekeeping NV RAM	DS1642	5V	STD	STD	2K
	DS1643	5V	STD	STD	8K
	DS1644	5V	STD	STD	32K
	DS1646	5V	STD	STD	128K
	DS1647	5V	STD	STD	512K
Watchdog Timekeepers	DS1283	3V, 5V	STD+hh	STD	50
	DS1284	5V	STD+hh	STD	50
	DS1286	5V	STD+hh	STD	50
	DS1384	5V	STD+hh	STD	50
	DS1386	5V	STD+hh	STD	8K, 32K
	DS1486	5V	STD+hh	STD	128K
PC Real Time Clocks	DS12885	5V	STD	STD	114
	DS12887	5V	STD	STD	114
	DS12887A	5V	STD	STD	114
	DS1385	5V	STD	STD	50+4K (4K accessed via HW control)
	DS1387	5V	STD	STD	50+4K (4K accessed via HW control)
	DS1485	5V	STD	STD	50+8K (8K accessed via HW control)
	DS1488	5V	STD	STD	50+8K (8K accessed via HW control)
	DS14285	5V	STD	STD	114
	DS14287	5V	STD	STD	114
	DS1585	5V	STD	STD	114+8K (8K accessed via HW control)
	DS1587	5V	STD	STD	114+8K (8K accessed via HW control)
	DS1685	3V, 5V	STD	STD	114+128 (128K accessed via SW control)
	DS1687	3V, 5V	STD	STD	114+128 (128K accessed via SW control)
	DS1688	3V, 5V	STD	STD	114
	DS1689	3V, 5V	STD	STD	114
	DS1691	3V, 5V	STD	STD	114
	DS1693	3V, 5V	STD	STD	114
	DS17285	3V, 5V	STD	STD	114+2K (2K accessed via SW control)
	DS17287	3V, 5V	STD	STD	114+2K (2K accessed via SW control)
	DS17485	3V, 5V	STD	STD	114+4K (4K accessed via SW control)
	DS17487	3V, 5V	STD	STD	114+4K (4K accessed via SW control)
	DS17885	3V, 5V	STD	STD	114+8K (8K accessed via SW control)
	DS17887	3V, 5V	STD	STD	114+8K (8K accessed via SW control)

*** TYPES OF INTERRUPTS:**

A - TIME OF DAY ALARM: Programmable interrupt is activated when the time of day matches the programmed alarm registers.

WD - WATCHDOG: Interrupt occurs after a programmed interval if the real time clock's watchdog registers are not accessed.

WU - WAKE-UP: An internal alarm designed to wake up the system at a specified time/date.

KS - KICKSTART: An external signal to the real time clock causes an interrupt output which turns on the system power supply.

I - INTERVAL: Interval timer can automatically accumulate time when power is applied to the real time clock.

CC - CYCLE COUNTER: Programmable cycle counter can accumulate the number of system power-on/off cycles.

Selection Table

Interrupts*	NV Control	Serial Number	Bus Type	Other
			3-WIRE	
			3-WIRE	
A x 2			3-WIRE OR SPI	
A x 2			3-WIRE OR SPI	1Hz, 32kHz Clock Outputs
			2-WIRE	
			3-WIRE	
			3-WIRE	
A, I, CC		X	3- OR 1-WIRE	
A, WD, RESET	X		3-WIRE	3-CHANNEL A/D, CPU RESET
A, I, CC		X	3- OR 1-WIRE	
	X		PARALLEL/PHANTOM	
			PARALLEL/PHANTOM	
			PARALLEL/PHANTOM	
			PARALLEL/PHANTOM	
			PARALLEL/PHANTOM	
	X		PARALLEL/PHANTOM	
			PARALLEL/PHANTOM	
			PARALLEL/PHANTOM	
			PARALLEL/PHANTOM	
			PARALLEL/PHANTOM	
			PARALLEL/BYTEWIDE	DIP, LPM Packages
			PARALLEL/BYTEWIDE	DIP, LPM Packages
			PARALLEL/BYTEWIDE	DIP, LPM Packages
			PARALLEL/BYTEWIDE	DIP, LPM Packages
			PARALLEL/BYTEWIDE	DIP, LPM Packages
A, WD			PARALLEL/BYTEWIDE	
A, WD			PARALLEL/BYTEWIDE	
A, WD			PARALLEL/BYTEWIDE	
A, WD	X		PARALLEL/BYTEWIDE	
A, WD			PARALLEL/BYTEWIDE	
A, WD			PARALLEL/BYTEWIDE	
A, P, U			PARALLEL/MUX'ED	
A, P, U			PARALLEL/MUX'ED	
A, P, U			PARALLEL/MUX'ED	
A, P, U			PARALLEL/MUX'ED	
A, P, U			PARALLEL/MUX'ED	
A, P, U			PARALLEL/MUX'ED	
A, P, U			PARALLEL/MUX'ED	
A, P, U	X		PARALLEL/MUX'ED	
A, P, U	X		PARALLEL/MUX'ED	
A, P, U, KS, WU, RC		X	PARALLEL/MUX'ED	
A, P, U, KS, WU, RC		X	PARALLEL/MUX'ED	
A, P, U, KS, WU, RC		X	PARALLEL/MUX'ED	32kHz Clock Outputs
A, P, U, KS, WU, RC		X	PARALLEL/MUX'ED	32kHz Clock Outputs
A, P, U, KS, WU, RC	X	X	PARALLEL/MUX'ED	32kHz Clock Outputs
A, P, U, KS, WU, RC	X	X	PARALLEL/MUX'ED	32kHz Clock Outputs
A, P, U, KS, WU, RC	X	X	PARALLEL/MUX'ED	32kHz Clock Outputs
A, P, U, KS, WU, RC	X	X	PARALLEL/MUX'ED	32kHz Clock Outputs
A, P, U, KS, WU, RC		X	PARALLEL/MUX'ED	32kHz Clock Outputs
A, P, U, KS, WU, RC		X	PARALLEL/MUX'ED	32kHz Clock Outputs
A, P, U, KS, WU, RC		X	PARALLEL/MUX'ED	32kHz Clock Outputs
A, P, U, KS, WU, RC		X	PARALLEL/MUX'ED	32kHz Clock Outputs
A, P, U, KS, WU, RC		X	PARALLEL/MUX'ED	32kHz Clock Outputs
A, P, U, KS, WU, RC		X	PARALLEL/MUX'ED	32kHz Clock Outputs

P - PERIODIC: Programmable period interrupt which occurs from 500 ms to 122 µs.

U - UPDATE IN PROGRESS: Allows the user to determine if the real time clock is ready to perform an update cycle.

RC - RAM CLEAR: A RAM clear interrupt is generated when the real time clock has completed a RAM clear operation.

RESET - Reset activated when an out-of-tolerance V_{CC} condition is detected.

DS1216s will accept ROM or static RAM of sizes indicated.

Notes:

†1. STANDARD CLOCK FORMAT (HH:MM:SS; HH-Hours, MM-MINUTES, SS-Seconds), hh-Hundredths

2. STANDARD CALENDAR FORMAT (dd:MM:DD:YY; dd-Day of the week, MM-Month, DD-Date of the month, YY-Year)

Memory Products

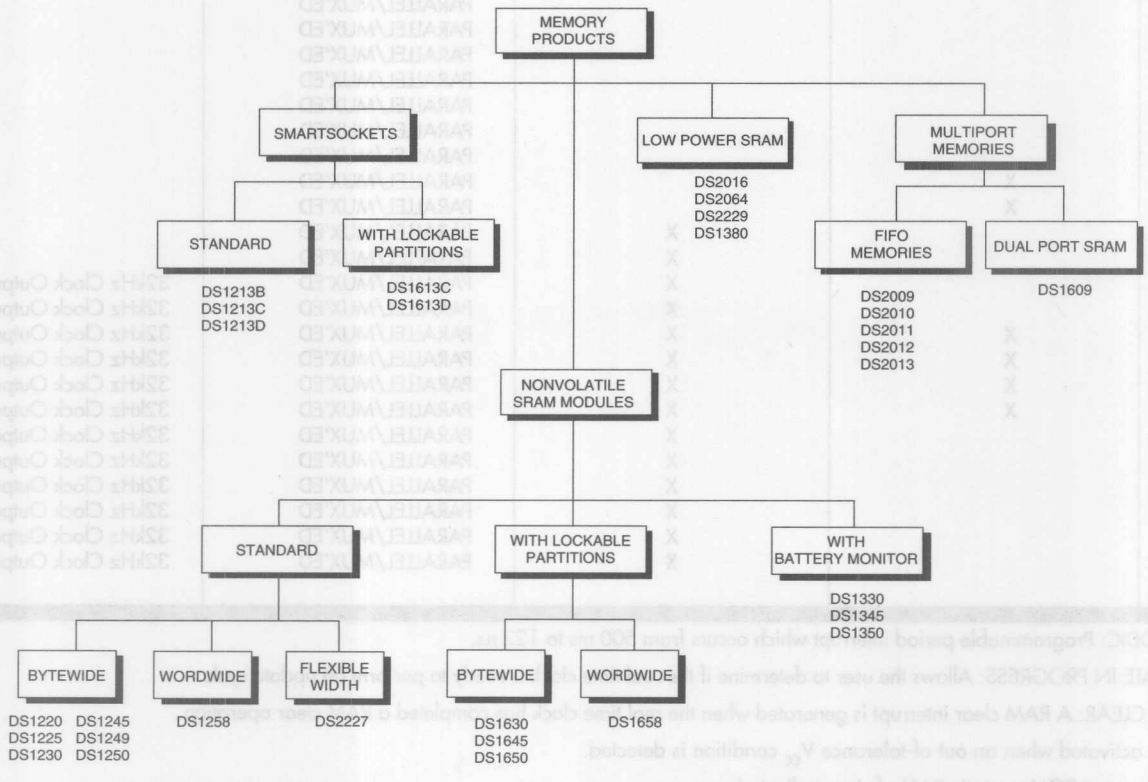
The centerpiece of the Memory Products family is our broad portfolio of Nonvolatile SRAM modules. Built using low-power SRAMs, nonvolatile memory controllers and lithium batteries, these NV SRAM modules offer nonvolatile storage that can be read and written an unlimited number of times, at SRAM speeds, without wearing out. Capable of more than ten years of battery-backed data retention, these products are truly ideal memories.

NV SRAM modules with lockable partitions offer programmable write-protection for each of 16 memory array partitions. Using a simple software command, any of these 16 partitions can be configured to be either read-only memory or read-write memory. This capability allows critical code and data to be stored in read-only areas and changeable data to be stored in read-write areas, all in the same nonvolatile memory component.

NV SRAM modules with Battery Monitoring are the first battery-backed SRAMs in the industry with the built-in ability to monitor their own batteries and issue a warning before their batteries reach end-of-life.

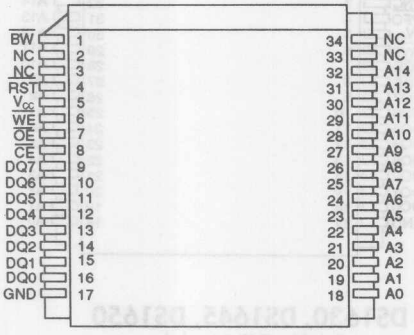
SmartSockets contain the nonvolatile memory controller and backup batteries needed to nonvolatize standard bytewide SRAM components. An SRAM inserted into a SmartSocket is a complete nonvolatile memory, identical in functionality to an NV SRAM module.

Our low-power SRAMs are the same memories we use in our own NV SRAM modules. Plugged into our SmartSockets or by themselves, these products are the world's best SRAMs for battery-backed memory applications because they require only nanoamps of data retention current.

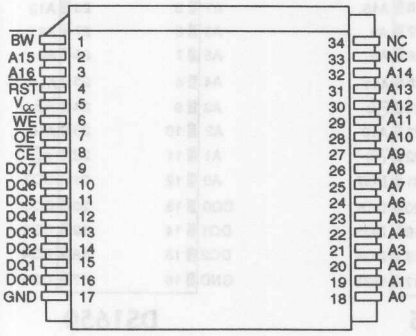


Most nonvolatile SRAM modules are also available in 3-volt versions.

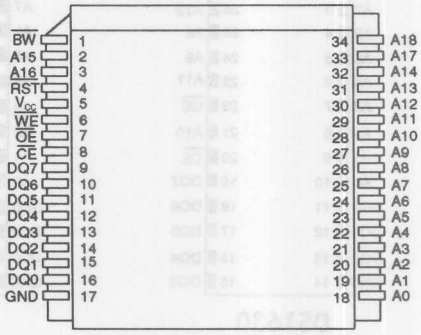
Nonvolatile SRAM with Battery Monitor



DS1330
34-Pin Low Profile Module



DS1345
34-Pin Low Profile Module



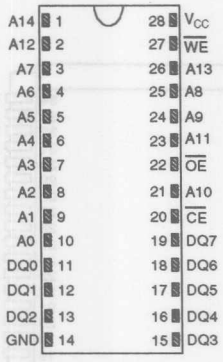
DS1350
34-Pin Low Profile Module

Key Features

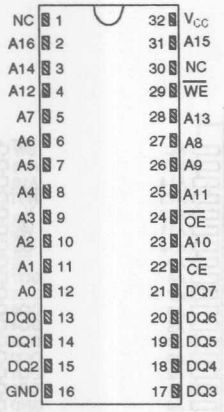
- Standard nonvolatile SRAM performance characteristics
  - —More than 10 years of data retention
  - —Data automatically protected during power cycling
  - —Read and write access times as fast as 70ns
  - —Freshness seal: internal lithium battery is electically disconnected to retain freshness until power is first applied
- Sophisticated battery monitor checks remaining capacity once per day and activates Battery Warning output when battery is nearing end of life
- CPU reset function holds system in reset when power supply goes out of tolerance and also serves as a power-on reset
- Low Profile Module package designed for surface-mount—snaps into standard, surface-mount PLCC sockets
- Compatible pinouts make designing for multiple memory sizes easy
- Optional industrial temperature range available

Featured Products

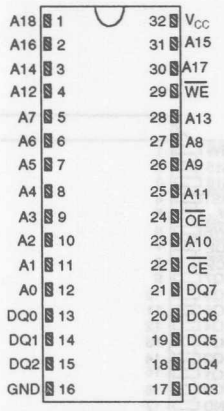
Nonvolatile SRAM with Lockable Partitions



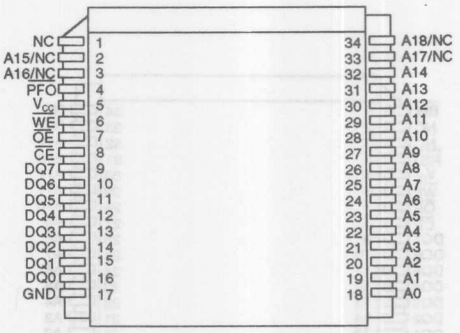
DS1630
28-Pin DIP
Module



DS1645
32-Pin DIP
Module



DS1650
32-Pin DIP
Module



DS1630, DS1645, DS1650
34-Pin DIP Module

Key Features

- Standard nonvolatile SRAM performance characteristics
  - —More than 10 years of data retention
  - —Data automatically protected during power cycling
  - —Read and write access times as fast as 70ns
  - —Freshness seal: internal lithium battery is electrically disconnected to retain freshness until power is first applied
- Programmable write-protection of any of 16 memory array partitions
- CPU interrupt function warns system when power supply goes out of tolerance
- DIP packages have JEDEC-standard 600-mil SRAM pinouts
- Low Profile Module package designed for surface-mount—snaps into standard, surface-mount PLCC sockets
- Compatible pinouts make designing for multiple memory sizes easy
- Optional industrial temperature range available

Selection Tables

DS12XXTTP-SSS-III STANDARD

Operating Temperature
Blank: 0°C to 70°C
IND: -40°C to +85°C

Access Time
100, 120, 150, or 200ns (DS1220)
70, 85, 150, or 200ns (DS1225)

Package
Blank: 24-pin DIP (DS1220)
28-pin DIP (DS1225)

Vcc Tolerance
AB: ±5%
AD: ±10%
Y: ±10%

Device
DS1220: 2K x 8
DS1225: 8K x 8

DS12XXTTP-SSS-III STANDARD

Operating Temperature
Blank: 0°C to 70°C
IND: -40°C to +85°C

Access Time
70: 70ns
100: 100ns

Package
Blank: 28-pin DIP (DS1230)
32-pin DIP (DS1245, 50)
40-pin DIP (DS1258)
L: 34-pin Low Profile Module

Vcc Tolerance
AB: ±5%
Y: ±10%

Device
DS1230: 32K x 8
DS1245: 128K x 8
DS1249: 256K x 8
DS1250: 512K x 8
DS1258: 128K x 16

DS16XXTTP-SSS-III LOCKABLE PARTITIONS

Operating Temperature
Blank: 0°C to 70°C
IND: -40°C to +85°C

Access Time
70: 70 ns
100: 100 ns

Package
Blank: 28-pin DIP (DS1630)
32-pin DIP (DS1645, 50)
40-pin DIP (DS1658)
L: 34-pin Low Profile Module

Vcc Tolerance
AB: ±5%
Y: ±10%

Device
DS1630: 32K x 8
DS1645: 128K x 8
DS1650: 512K x 8
DS1658: 128K x 16

DS13XXTTP-SSS-III BATTERY MONITOR

Operating Temperature
Blank: 0°C to 70°C
IND: -40°C to +85°C

Access Time
70: 70 ns
100: 100 ns

Package
L: 34-pin Low Profile Module

Vcc Tolerance
AB: ±5%
Y: ±10%

Device
DS1330: 32K x 8
DS1345: 128K x 8
DS1350: 512K x 8

Selection Tables

SmartSockets

Part Number	Lockable Partitions	Supports 2K x 8 SRAM	Supports 8K x 8 SRAM	Supports 32K x 8 SRAM	Supports 128K x 8 SRAM	Supports 512K x 8 SRAM	DIP Pin Count
DS1213B		X	X				28
DS1213C				X			28
DS1213D					X	X*	32
DS1613C	X			X			28
DS1613D	X				X		32

* With user modification. See Application Note 4 in the Application Note Book.

Low-Power SRAM

Part Number	Density	Temperature	5-Volt Speed	3-Volt Speed	Package
DS2016-100	2K x 8	-40°C to +85°C	100ns	250ns	24-pin DIP
DS2016S-100	2K x 8	-40°C to +85°C	100ns	250ns	24-pin SOIC
DS2016-150	2K x 8	-40°C to +85°C	150ns	250ns	24-pin DIP
DS2016S-150	2K x 8	-40°C to +85°C	150ns	250ns	24-pin SOIC
DS2064-200	8K x 8	-40°C to +85°C	200ns	300ns	28-pin DIP
DS2064S-200	8K x 8	-40°C to +85°C	200ns	300ns	28-pin SOIC
DS2229-85	512K x 16	0°C to +70°C	85ns	n/a	80-pin SIP Stik

Selection Tables

Multiport Memories

DS20XXPI-SSS FIFO MEMORIES

Access Time
35: 35ns
50: 50ns
65: 65ns
80: 80ns
120: 120ns

Operating Temperature
Blank: 0°C to 70°C
N: -40°C to +85°C

Package
Blank: 28-pin 600-mil DIP
D: 28-pin 300-mil DIP
R: 32-pin PLCC

Device
DS2009: 512K x 9
DS2010: 1024K x 9
DS2011: 2048K x 9
DS2012: 4096K x 9
DS2013: 8192 x 9

DS1609P-SSS DUAL PORT SRAM

Access Time
50: 50ns

Package
Blank: 24-pin 600-mil DIP
S: 24-pin 300-mil SOIC

Cross Reference

Nonvolatile SRAM Modules

Benchmarq Part Number	Memory Density	DS Standard Modules	DS Partitionable Modules
bq4010MA-XXX	8K x 8	DS1225AB-XXX	
bq4010MA-XXXN	8K x 8	DS1225AB-XXX-IND	
bq4010YMA-XXX	8K x 8	DS1225AD-XXX	
bq4010YMA-XXXN	8K x 8	DS1225AD-XXX-IND	
bq4011MA-XXX	32K x 8	DS1230AB-XXX	DS1630AB-XXX
bq4011MA-XXXN	32K x 8	DS1230AB-XXX-IND	DS1630AB-XXX-IND
bq4011YMA-XXX	32K x 8	DS1230Y-XXX	DS1630Y-XXX
bq4011YMA-XXXN	32K x 8	DS1230Y-XXX-IND	DS1630Y-XXX-IND
bq4013MA-XXX	128K x 8	DS1245AB-XXX	DS1645AB-XXX
bq4013MA-XXXN	128K x 8	DS1245AB-XXX-IND	DS1645AB-XXX-IND
bq4013YMA-XXX	128K x 8	DS1245Y-XXX	DS1645Y-XXX
bq4013YMA-XXXN	128K x 8	DS1245Y-XXX-IND	DS1645Y-XXX-IND
bq4014YMB-XXX	256K x 8	DS1249Y-XX	
bq4015MA-XXX	512K x 8	DS1250AB-XXX	DS1650AB-XXX
bq4015YMA-XXX	512K x 8	DS1250Y-XXX	DS1650Y-XXX
bq4024MA-XXX	128K x 16	DS1258AB-XXX	DS1658AB-XXX
bq4024YMA-XXX	128K x 16	DS1258Y-XXX	DS1658Y-XXX

SGS-Thomson Part Number	Memory Density	DS Standard Modules	DS Partitionable Modules
M48Z02-XXXPC1	2K x 8	DS1220AB-XXX	
M48Z02-XXXPC6	2K x 8	DS1220AB-XXX-IND	
M48Z12-XXXPC1	2K x 8	DS1220AD-XXX	
M48Z12-XXXPC6	2K x 8	DS1220AD-XXX-IND	
M48Z08-XXXPC1	8K x 8	DS1225AB-XXX	
M48Z18-XXXPC1	8K x 8	DS1225AD-XXX	
M48Z18-XXXPC6	8K x 8	DS1225AD-XXX-IND	
M48Z58-XXXPC1	8K x 8	DS1225AB-XXX	
M48Z58Y-XXXPC1	8K x 8	DS1225AD-XXX	
M48Z30-XXXPM1	32K x 8	DS1230AB-XXX	DS1630AB-XXX
M48Z30Y-XXXPM1	32K x 8	DS1230Y-XXX	DS1630Y-XXX
M48Z32-XXXPC1	32K x 8	DS1230AB-XXX	DS1630AB-XXX
M48Z32Y-XXXPC1	32K x 8	DS1230Y-XXX	DS1630Y-XXX
M48Z35-XXXPC1	32K x 8	DS1230AB-XXX	DS1630AB-70
M48Z35Y-XXXPC1	32K X 8	DS1230Y-XXX	DS1630Y-70
M48Z128-XXXPM1	128K x 8	DS1245AB-XXX	DS1645AB-XXX
M48Z128Y-XXXPM1	128K x 8	DS1245Y-XXX	DS1645Y-XXX
M48Z256Y-XXXPL1	256K X 8	DS1249Y-XXX	
M48Z512-XXXPM1	512K x 8	DS1250AB-XXX	DS1650AB-XXX
M48Z512Y-XXXPM1	512K x 8	DS1250Y-XXX	DS1650Y-XXX
M46Z128-XXXPM1	128K x 16	DS1258AB-XXX	DS1658AB-XXX
M46Z128Y-XXXPM1	128K x 16	DS1258Y-XXX	DS1658Y-XXX

Cross Reference

Multiport Memories

AMD Part No.	Config.	Package	Dallas Semi Replacement
AM7201A-xxPC	512 x 9	28-pin 600 mil DIP	DS2009-xxx
AM7201A-xxRC	512 x 9	28-pin 300 mil DIP	DS2009D-xxx
AM7201A-xxJC	512 x 9	32-pin PLCC	DS2009R-xxx
AM7202A-xxPC	1K x 9	28-pin 600 mil DIP	DS2010-xxx
AM7202A-xxRC	1K x 9	28-pin 300 mil DIP	DS2010D-xxx
AM7202A-xxJC	1K x 9	32-pin PLCC	DS2010R-xxx
AM7203A-xxPC	2K x 9	28-pin 600 mil DIP	DS2011-xxx
AM7203A-xxRC	2K x 9	28-pin 300 mil DIP	DS2011D-xxx
AM7203A-xxJC	2K x 9	32-pin PLCC	DS2011R-xxx
AM7204A-xxPC	4K x 9	28-pin 600 mil DIP	DS2012-xxx
AM7204A-xxJC	4K x 9	32-pin PLCC	DS2012R-xxx
AM7205A-xxPC	8K x 9	28-pin 600 mil DIP	DS2013-xxx

IDT Part No.	Config.	Package	Dallas Semi Replacement
IDT7201SA-xxP	512 x 9	28-pin 600 mil DIP	DS2009-xxx
IDT7201SA-xxTP	512 x 9	28-pin 300 mil DIP	DS2009D-xxx
IDT7201SA-xxJ	512 x 9	32-pin PLCC	DS2009R-xxx
IDT7202SA-xxP	1K x 9	28-pin 600 mil DIP	DS2010-xxx
IDT7202SA-xxTP	1K x 9	28-pin 300 mil DIP	DS2010D-xxx
IDT7202SA-xxJ	1K x 9	32-pin PLCC	DS2010R-xxx
IDT7203SA-xxP	2K x 9	28-pin 600 mil DIP	DS2011-xxx
IDT7203SA-xxTP	2K x 9	28-pin 300 mil DIP	DS2011D-xxx
IDT7203SA-xxJ	2K x 9	32-pin PLCC	DS2011R-xxx
IDT7204SA-xxP	4K x 9	28-pin 600 mil DIP	DS2012-xxx
IDT7204SA-xxJ	4K x 9	32-pin PLCC	DS2012R-xxx
IDT7205SA-xxP	8K x 9	28-pin 600 mil DIP	DS2013-xxx
IDT7205SA-xxTP	8K x 9	28-pin 300 mil DIP	DS2013D-xxx

Mosel Part No.	Config.	Package	Dallas Semi Replacement
MS7201A-xxPC	512 x 9	28-pin 600 mil DIP	DS2009-xxx
MS7201A-xxNC	512 x 9	28-pin 300 mil DIP	DS2009D-xxx
MS7201A-xxJC	512 x 9	32-pin PLCC	DS2009R-xxx
MS7202A-xxPC	1K x 9	28-pin 600 mil DIP	DS2010-xxx
MS7202A-xxNC	1K x 9	28-pin 300 mil DIP	DS2010D-xxx
MS7202A-xxJC	1K x 9	32-pin PLCC	DS2010R-xxx
MS7203A-xxPC	2K x 9	28-pin 600 mil DIP	DS2011-xxx
MS7203A-xxNC	2K x 9	28-pin 300 mil DIP	DS2011D-xxx
MS7203A-xxJC	2K x 9	32-pin PLCC	DS2011R-xxx
MS7204A-xxPC	4K x 9	28-pin 600 mil DIP	DS2012-xxx
MS7204A-xxJC	4K x 9	32-pin PLCC	DS2012R-xxx

Sharp Part No.	Config.	Package	Dallas Semi Replacement
LH5496-xx	512 x 9	28-pin 600 mil DIP	DS2009-xxx
LH5496D-xx	512 x 9	28-pin 300 mil DIP	DS2009D-xxx
LH5496U-xx	512 x 9	32-pin PLCC	DS2009R-xxx
LH5497-xx	1K x 9	28-pin 600 mil DIP	DS2010-xxx
LH5497D-xx	1K x 9	28-pin 300 mil DIP	DS2010D-xxx
LH5497U-xx	1K x 9	32-pin PLCC	DS2010R-xxx
LH5498-xx	2K x 9	28-pin 600 mil DIP	DS2011-xxx
LH5498D-xx	2K x 9	28-pin 300 mil DIP	DS2011D-xxx
LH5498U-xx	2K x 9	32-pin PLCC	DS2011R-xxx
LH5499-xx	4K x 9	28-pin 600 mil DIP	DS2012-xxx
LH5499U-xx	4K x 9	32-pin PLCC	DS2012R-xxx

SGS-Thomson Part No.	Config.	Package	Dallas Semi Replacement
MK4501N-xx	512 x 9	28-pin 600 mil DIP	DS2009-xxx
MK4501K-xx	512 x 9	32-pin PLCC	DS2009R-xxx
MK4502N-xx	1K x 9	28-pin 600 mil DIP	DS2010-xxx
MK4502K-xx	1K x 9	32-pin PLCC	DS2010R-xxx
MK4503N-xx	2K x 9	28-pin 600 mil DIP	DS2011-xxx
MK4503K-xx	2K x 9	32-pin PLCC	DS2011R-xxx
MK4504N-xx	4K x 9	28-pin 600 mil DIP	DS2012-xxx

Vitelic Part No.	Config.	Package	Dallas Semi Replacement
V61C01P-xx	512 x 9	28-pin 600 mil DIP	DS2009-xxx
V61C01S-xx	512 x 9	28-pin 300 mil DIP	DS2009D-xxx
V61C02P-xx	1K x 9	28-pin 600 mil DIP	DS2010-xxx
V61C02S-xx	2K x 9	28-pin 300 mil DIP	DS2010R-xxx

Cross Reference

Micron Part No.	Config.	Package	Dallas Semi Replacement
MT52C9005-xxW	512 x 9	28-pin 600 mil DIP	DS2009-xxx
MT52C9005-xxBJ	512 x 9	32-pin PLCC	DS2009R-xxx
MT52C9010-xxW	1K x 9	28-pin 600 mil DIP	DS2010-xxx
MT52C9010-xxBJ	1K x 9	32-pin PLCC	DS2010R-xxx
MT52C9020-xxW	2K x 9	28-pin 600 mil DIP	DS2011-xxx
MT52C9020-xxBJ	2K x 9	32-pin PLCC	DS2011R-xxx
MT52C9040-xxW	4K x 9	28-pin 600 mil DIP	DS2012-xxx
MT52C9040-xxBJ	4K x 9	32-pin PLCC	DS2012R-xxx

Samsung Part No.	Config.	Package	Dallas Semi Replacement
KM75C01AP-xx	512 x 9	28-pin 600 mil DIP	DS2009-xxx
KM75C01AN-xx	512 x 9	28-pin 300 mil DIP	DS2009D-xxx
KM75C01AJ-xx	512 x 9	32-pin PLCC	DS2009R-xxx
KM75C02AP-xx	1K x 9	28-pin 600 mil DIP	DS2010-xxx
KM75C01AN-xx	1K x 9	28-pin 300 mil DIP	DS2010D-xxx
KM7502AJ-xx	1K x 9	32-pin PLCC	DS2010R-xxx
KM75C03AP-xx	2K x 9	28-pin 600 mil DIP	DS2011-xxx
KM75C03AN-xx	2K x 9	28-pin 300 mil DIP	DS2011D-xxx
KM75C03AJ-xx	2K x 9	32-pin PLCC	DS2011R-xxx
KM75C04AP-xx	4K x 9	28-pin 600 mil DIP	DS2012-xxx

Thermal Sensors

Dallas' Thermal Sensors bring a new level of integration to temperature measurement and thermostatic functions: the Direct-to-Digital advantage. Our temperature sensors provide a digital output directly from the sensor, eliminating the need for analog-to-digital converters. The digital thermometers and thermostats are calibrated at the factory in Dallas, alleviating the need for user calibration or compensation and linearization networks. The products also feature a temperature measurement range of -55°C to +125°C. These features make for a solution that is smaller and more accurate than other temperature sensing technologies.

Thermostatic functions are provided on all the temperature sensors, allowing the user to program in thermal trip point limits, which are stored in nonvolatile EEPROM memory. These limits can be changed at any time by the user, allowing the devices to be updated as the system configuration changes or as aging or environmental factors dictate.

The Direct-to-Digital temperature sensors are offered with a variety of interface and package options.

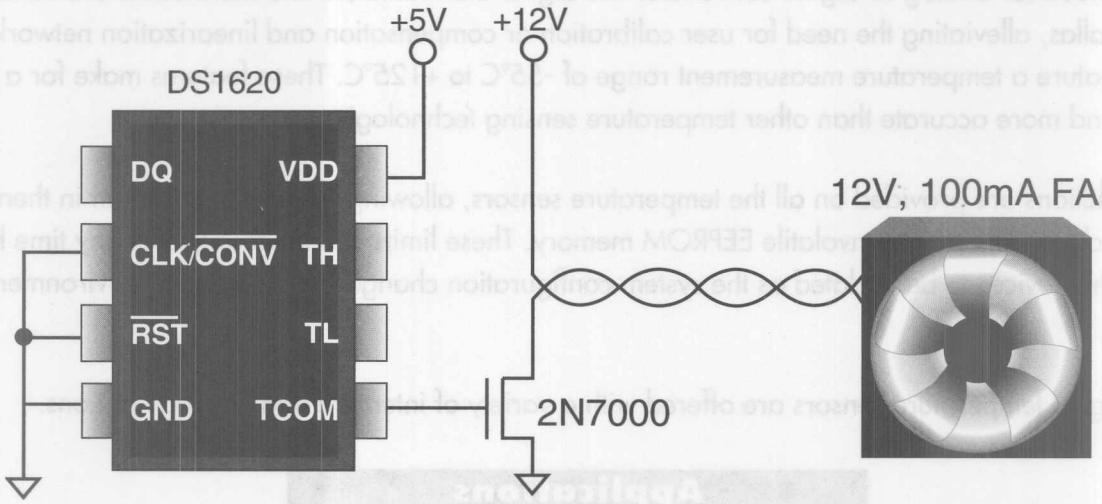
Applications

- Fan control for computing equipment
- Clock speed adjustment to minimize temperature rise for high-power microprocessors like Pentium, Alpha, and PowerPC
- Scientific and analytical measurements
- Building automation and environmental controls
- Temperature compensation of crystal oscillators in sensitive time or frequency measurement applications

Selection Table

Part Number	Interface	V_{CC}	Resolution	Thermostat Outputs	Multidrop	Memory	Packages
DS1620	3-Wire	5V	0.5°C	High, Low, Com	No	TH, TL	8-pin DIP 8-pin SOIC
DS1621	2-Wire	3V/5V	0.5°C	Com	Yes, up to 8	TH, TL	8-pin DIP 8-pin SOIC
DS1623	3-Wire	3V/5V	0.5°C	High, Low, Com	No	TH, TL	8-pin DIP 8-pin SOIC
DS1624	2-Wire	3V/5V	0.03125°C	None	Yes, up to 8	256 bytes EEPROM	8-pin DIP 8-pin SOIC
DS1625	2-Wire	5V	0.5°C	Com	Yes, up to 8	TH, TL	8-pin DIP 8-pin SOIC
DS1820	1-Wire	3V/5V	0.5°C	Alarm Search	Yes, 64-Bit Serial Number	TH, TL	PR-35 16-pin SSOP
DS1821	1-Wire	3V/5V	1°C	Com	No	TH, TL	PR-35 8-pin SOIC TO-220

Application Diagram



DS1620: Using the T_{COM} output to drive a fan

Digital Potentiometers

Dallas Semiconductor has been manufacturing digital pots since 1989 when we introduced the DS1267 Dual Digital Potentiometer. Why are so many companies choosing digital pots over mechanical devices? The digital solution offers advantages in device control, reliability, power consumption, accuracy, manufacturing, and packaging options.

Dallas Digital Pots are used in all market segments, including personal computers, telecommunications, industrial, audio, multi-media, and automotive. Applications range from simple LCD contrast control to volume and tone control, automatic gain control, trimming, and battery charging.

We now offer a family of 15 digital pots, with more to come. Current devices offer linear or non-linear characteristics; 3V, 5V or dual (±5V) operation; volatile and nonvolatile versions; industrial and commercial temperature grades; and five interface control options, including Dallas 3-wire, increment/decrement, pushbutton control, 2-wire addressability, and 3-input parallel. If you don't see what you need here, give us a call. We have worked with a variety of customers to meet their needs.

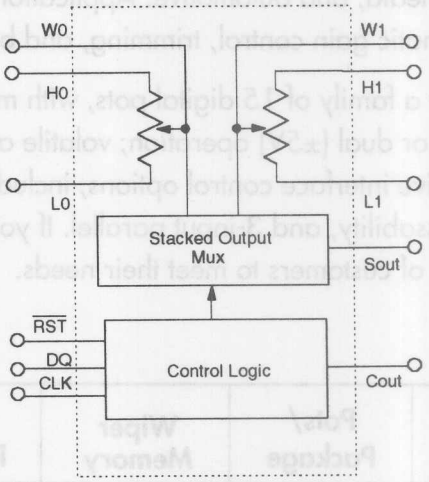
Device	Pots/ Package	Wiper Memory	# of Positions	Resistance	Power Supply	Control Interface
DS1267	2	Volatile	256-Lin	10K, 50K, 100K	5V, ±5V	3-Wire Serial
DS1666	1	Volatile	128-Lin	10K, 50K, 100K	5V, ±5V	Increment/Decrement
DS1667	2	Volatile	256-Lin	10K, 50K, 100K	5V, ±5V	3-Wire Serial
DS1669	1	Nonvolatile	64-Lin	10K, 50K, 100K	4.5V to 8.0V	Contact-Closure
DS1800	2	Volatile	128-Log	50K	2.7V to 5.5V	3-Wire Serial
DS1801	2	Volatile	64-Log	50K	2.7V to 5.5V	3-Wire Serial
DS1802	2	Volatile	64-Log	50K	2.7V to 5.5V	3-Wire Serial
DS1803	2	Volatile	256-Lin	10K, 50K, 100K	2.7V to 5.5V	2-Wire Addressable
DS1804	1	Nonvolatile	100-Lin	10K, 50K, 100K	2.7V to 5.5V	Increment/Decrement
DS1806	6	Volatile	64-Lin	10K, 50K, 100K	2.7V to 5.5V	3-Wire Addressable
DS1807	2	Volatile	64-Log	50K	2.7V to 5.5V	2-Wire Addressable
DS1866	1	Volatile	8-Log	10K	2.7V to 5.5V	3-Input Parallel
DS1867	2	Nonvolatile	256-Lin	10K, 50K, 100K	5V, ±5V	3-Wire Serial
DS1868	2	Volatile	256-Lin	10K, 50K, 100K	5V, ±3V	3-Wire Serial
DS1869	1	Nonvolatile	64-Lin	10K, 50K, 100K	3.0V to 8.0V	Contact-Closure

Featured Products

DS1267
Dual Digital Potentiometer

Key Features

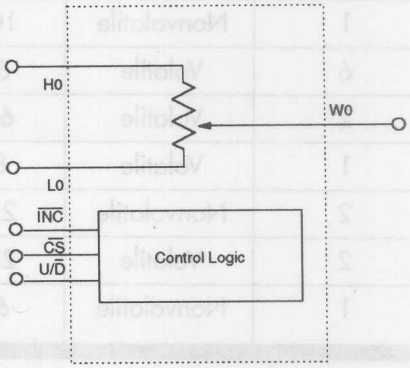
- Two 256-position potentiometers
- 3-wire serial CPU-controlled interface
- Single or dual power supply operation (5V or ±5V)
- Daisy chain capability
- Commercial & industrial versions
- 10K, 50K, and 100K ohm versions
- 14-pin DIP, 16-pin (300 mil) SOIC and 20-pin TSSOP



DS1666
Audio Taper Potentiometer

Key Features

- Single 128-position potentiometer
- Tapered resistive characteristic
- Single or dual power supply operation (5V or ±5V)
- Increment/decrement control interface
- Power-up position 13
- Commercial & industrial versions
- 10K, 50K, and 100K ohm versions
- 14-pin DIP, 16-pin (300 mil) SOIC

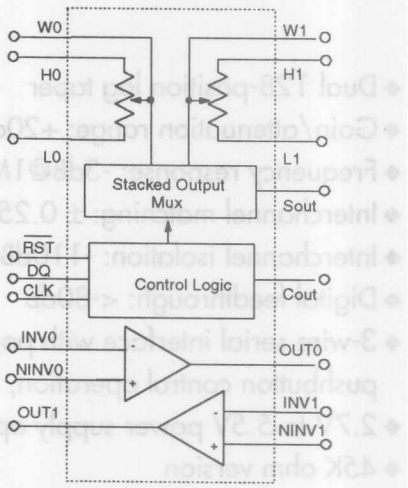


Featured Products

DS1667
Dual Digital Potentiometer w/Op Amps

Key Features

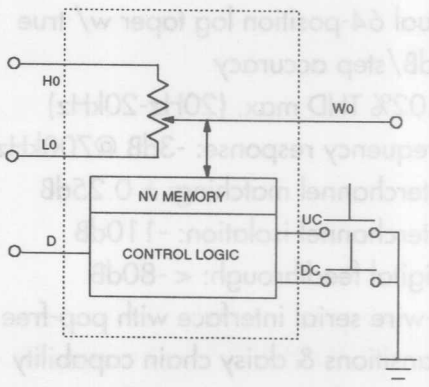
- Two 256-position potentiometers
- Two independent wideband operational amplifiers
- 3-wire serial CPU-controlled interface
- Single or dual power supplies (5V or ±5V)
- Commercial & industrial versions
- 10K, 50K, and 100K ohm versions
- 20-pin DIP, 20-pin (300 mil) SOIC, and 20-pin TSSOP



DS1669
Dallastat™

Key Features

- Single 64-position potentiometer
- Nonvolatile auto-wiper storage
- Digital or pushbutton control interface options
- 4.5V to 8.0V power supplies
- Commercial & industrial versions
- 10K, 50K, and 100K ohm versions
- 8-pin DIP, 8-pin (208 mil) SOIC



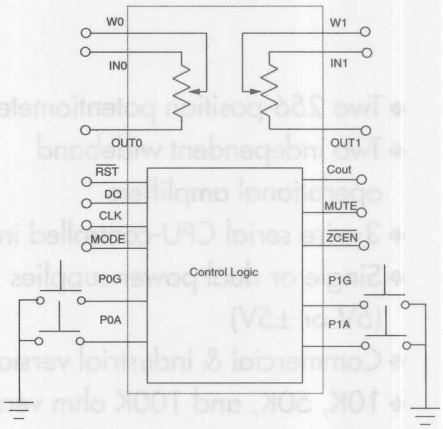
Featured Products

DS1800
Dual Inverting Log Gain/Attentuator

Key Features

- Dual 128-position log taper
- Gain/attenuation range: +20dB to -63dB
- Frequency response: -3dB@1MHz
- Interchannel matching: ± 0.25dB
- Interchannel isolation: -110dB
- Digital feedthrough: <-80dB
- 3-wire serial interface with pop-free transitions, pushbutton control operation, & daisy chain capability
- 2.7V to 5.5V power supply operation
- 45K ohm version
- 20-pin DIP, (300 mil) SOIC and TSSOP

New

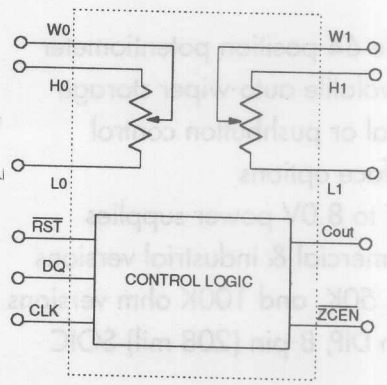


DS1801
Dual Digital Audio Taper Potentiometer

Key Features

- Dual 64-position log taper w/ true 1dB/step accuracy
- 0.02% THD max. (20Hz-20kHz)
- Frequency response: -3dB @700kHz
- Interchannel matching: ± 0.25dB
- Interchannel isolation: -110dB
- Digital feedthrough: < -80dB
- 3-wire serial interface with pop-free transitions & daisy chain capability
- 2.7V to 5.5V power supply operation
- 14-pin DIP, 14-pin TSSOP and 16-pin (300 mil) SOIC

New



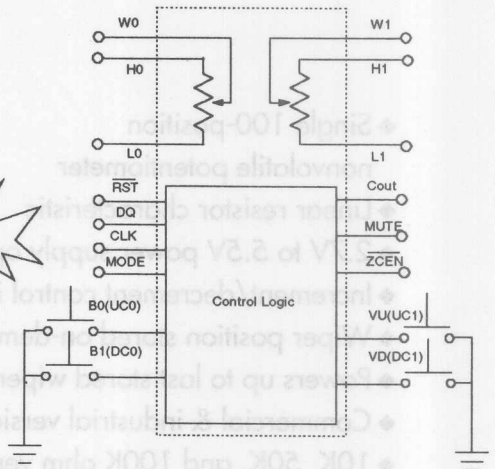
Featured Products

DS1802
Dual Digital Audio Taper Potentiometer with Pushbutton Control

Key Features

- Dual 64-position log taper w/true 1dB/step accuracy
- 0.02% THD max. (20Hz-20kHz)
- Frequency response: -3dB 700kHz
- Interchannel matching: ± 0.25dB
- Interchannel isolation: -110dB
- Digital feedthrough: < -80dB
- 3-Wire serial interface with pop-free transitions and daisy chain capability
- Manually controlled, contact-closure interface
- 2.7V to 5.5V power supply operation
- 20-pin DIP, 20-pin (300 mil) SOIC and 20-pin TSSOP

New

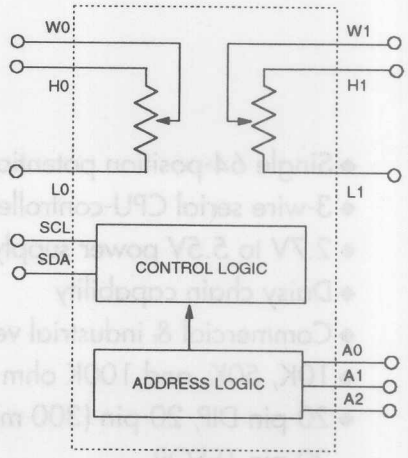


DS1803
Dual Addressable Potentiometer

Key Features

- Two 256-position potentiometers
- 2-wire addressable interface
- Addresses up to 8 devices on bus
- 2.7V to 5.5V power supply operation
- Commercial & industrial versions
- 10K, 50K, and 100K ohm versions
- 14-pin DIP, 16-pin (150 mil) SOIC and 14-pin TSSOP

New



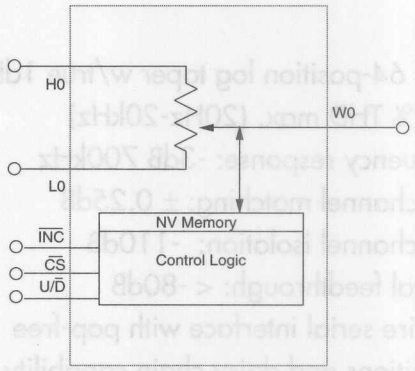
Featured Products

DS1804
NV Trimmer Potentiometer

Key Features

- Single 100-position nonvolatile potentiometer
- Linear resistor characteristic
- 2.7V to 5.5V power supply operation
- Increment/decrement control interface
- Wiper position stored on-demand
- Powers up to last stored wiper position
- Commercial & industrial versions
- 10K, 50K, and 100K ohm versions
- 8-pin DIP, 8-pin (150 mil) SOIC

New

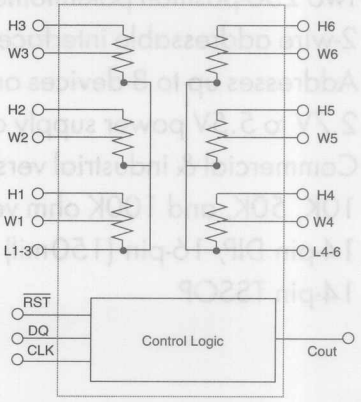


DS1806
Digital Sextet Potentiometer

Key Features

- Single 64-position potentiometer
- 3-wire serial CPU-controlled interface
- 2.7V to 5.5V power supply operation
- Daisy chain capability
- Commercial & industrial versions
- 10K, 50K, and 100K ohm versions
- 20-pin DIP, 20-pin (300 mil) SOIC and 20-pin TSSOP

New



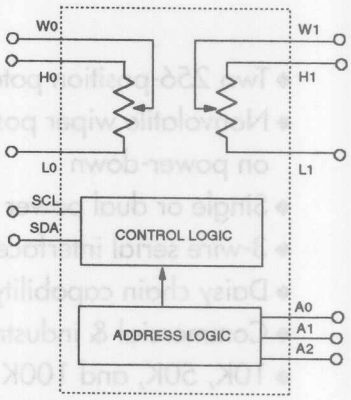
Featured Products

DS1807
Addressable Dual Audio Taper Potentiometer

Key Features

- Dual 64-position log taper w/true 1dB/step accuracy
- 0.02% THD max. (20Hz-20kHz)
- Frequency response: -3dB @ 700kHz
- Interchannel matching: ± 0.25dB
- Interchannel isolation: -110dB
- Digital feedthrough: < -80dB
- Address up to 8 devices on bus
- 2-wire addressable interface
- 2.7V to 5.5V power supply operation
- 14-pin DIP, 14-pin TSSOP, and 16-pin (300 mil) SOIC

New

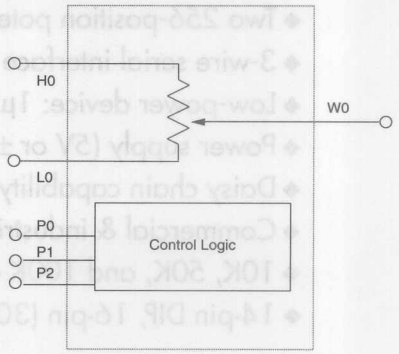


DS1866
Log Trimmer Potentiometer

Key Features

- Single 8-position potentiometer
- Tapered resistor characteristic: 5dB/step
- 2.7V to 5.5V power supply operation
- 3-terminal parallel interface control
- Wiper position powers up to state of parallel interface
- Commercial & industrial versions
- 10K ohm version
- 8-pin DIP, 8-pin (150 mil) SOIC

New



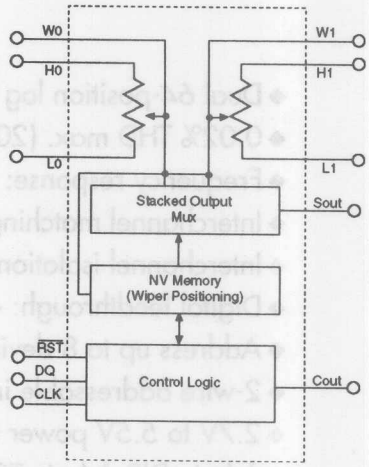
Featured Products

DS1867
Nonvolatile Dual Digital Potentiometer

Key Features

New

- Two 256-position potentiometers
- Nonvolatile wiper position storage on power-down
- Single or dual power supplies (5V or ±5V)
- 3-wire serial interface
- Daisy chain capability
- Commercial & industrial versions
- 10K, 50K, and 100K ohm versions
- 14-pin DIP, 16-pin (300 mil) SOIC, and 20-pin TSSOP

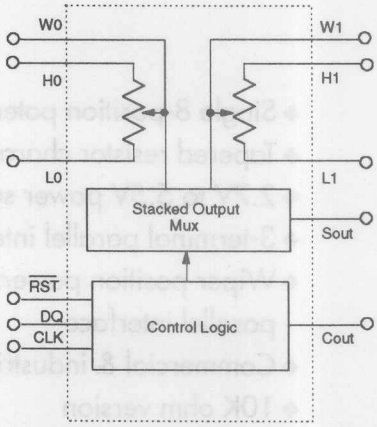


DS1868
5V Dual Digital Potentiometer

Key Features

New

- Two 256-position potentiometers
- 3-wire serial interface
- Low-power device: 1µA standby
- Power supply (5V or ±3V)
- Daisy chain capability
- Commercial & industrial versions
- 10K, 50K, and 100K ohm versions
- 14-pin DIP, 16-pin (300 mil) SOIC, and 20-pin TSSOP



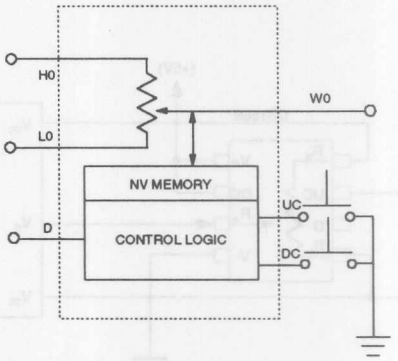
Featured Products

DS1869
Dallastat™

Key Features

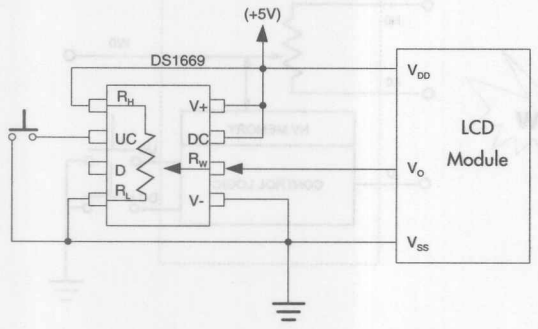
- Single 64-position potentiometer
- Nonvolatile auto-wiper storage
- Digital or pushbutton control interface options
- 3.0V to 8.0V power supply operation
- Commercial versions
- 10K, 50K, and 100K ohm versions
- 8-pin DIP, 8-pin (208 mil) SOIC

New

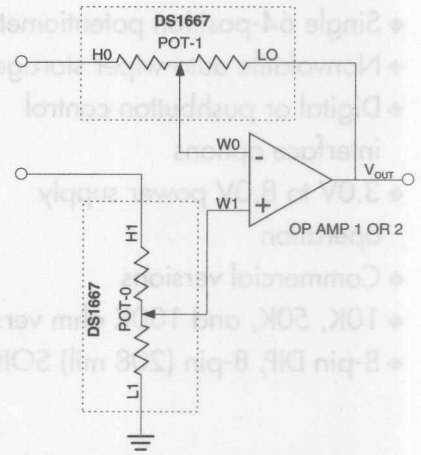


Application Diagrams

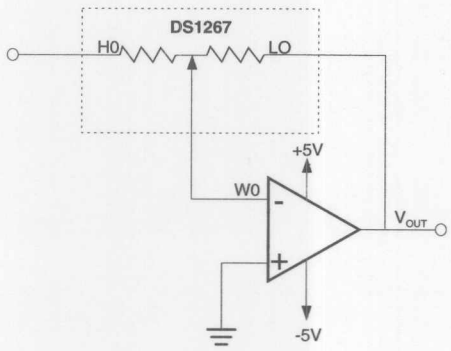
LCD Contrast Control Using the Dallastat



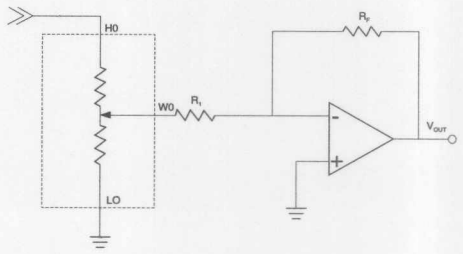
Programmable Differential Amplifier Using the DS1667



Inverting Variable Gain Amplifier



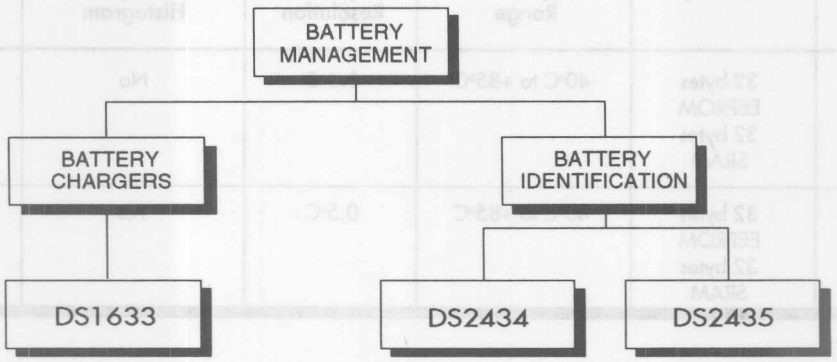
Fixed Gain Attenuator Amplifier



Battery Management

Dallas Semiconductor's Battery Chargers are complete solutions – the entire Battery Charger is contained in a simple, 3-pin device that can be programmed to fit the specific needs of the battery pack to be charged. This allows the same device to be stocked and used in several different designs, removing the need to engineer a new charger for each new product. Design time for Battery Chargers becomes just minutes instead of days.

Battery identification devices allow information important to charging, monitoring, manufacturing, and disposing of the battery pack to be carried inside the pack, while also performing the temperature monitoring necessary to ensure battery life.



Key Features

- Manufacturer ID of the pack identifies the pack as "yours." A number programmed by Dallas is contained in the device which is unchangeable and unique to each customer.
- 32 bytes of EEPROM memory carry important information such as retained capacity, charging characteristics, battery chemistry identifiers, manufacturing lot and date codes, etc.
- Our unique Direct-to-Digital temperature sensor allows monitoring battery temperature during charging.
- A time/temperature histogram function allows a more accurate determination of self-discharge and retained capacity (DS2435).

Selection Tables

Battery Chargers

Part Number	Maximum Battery Voltage	Maximum Charging Current	Packages
DS1633	4.7V	100mA	TO-220

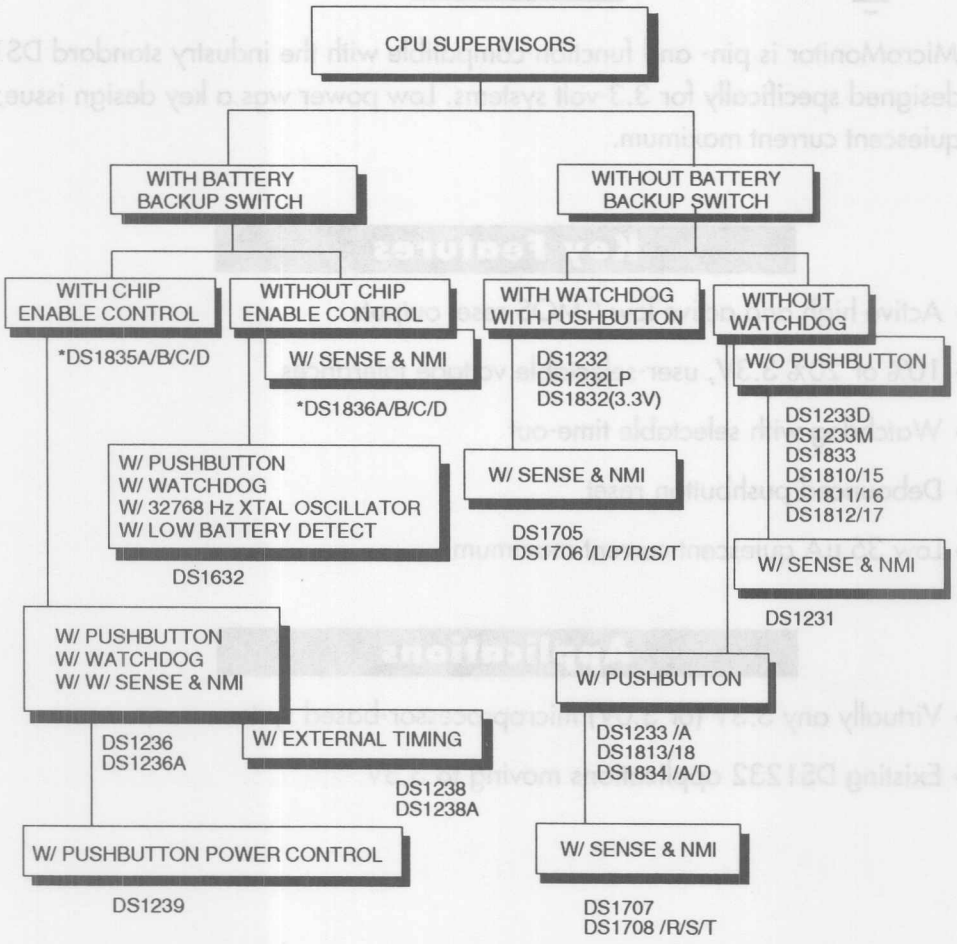
Battery ID

Part Number	Memory	Temperature Range	Temperature Resolution	Time/Temperature Histogram	Packages
DS2434	32 bytes EEPROM 32 bytes SRAM	-40°C to +85°C	0.5°C	No	PR-35
DS2435	32 bytes EEPROM 32 bytes SRAM	-40°C to +85°C	0.5°C	Yes	PR-35

CPU Supervisors

The defining feature of the CPU Supervisor family of products is a power monitor reset with a timed output guaranteeing stable predictable operation during power transitions. These devices provide systems (i.e., power supplies and microprocessors) time to stabilize prior to starting normal operation. They also stop microprocessors as power degrades to protect valuable nonvolatile memory.

Dallas Semiconductor's CPU Supervisors provide customers the advantage of a digital output to alert systems of critical analog power conditions. They improve reliability, simplify design, and minimize the number of discrete components required to perform vital power monitoring. They also provide more complex system monitoring functions with features such as watchdogs, pushbutton resets, and chip enable controls.

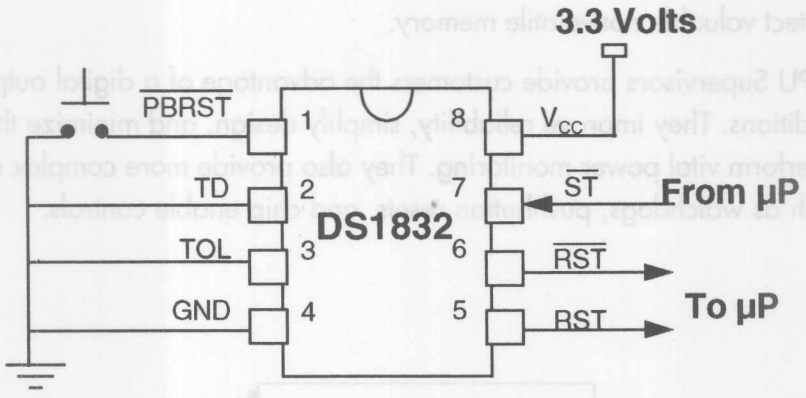


*New products in development

Product Preview

DS1832

3.3-Volt MicroMonitor



The DS1832 3.3-volt MicroMonitor is pin- and function-compatible with the industry standard DS1232 MicroMonitor chip. The device was designed specifically for 3.3-volt systems. Low power was a key design issue; the device only draws only 35 µA of quiescent current maximum.

Key Features

- Active high and active low CMOS reset outputs
- 10% or 20% 3.3V, user-selectable voltage tolerances
- Watchdog with selectable time-out
- Debounced pushbutton reset
- Low 35 µA quiescent current maximum

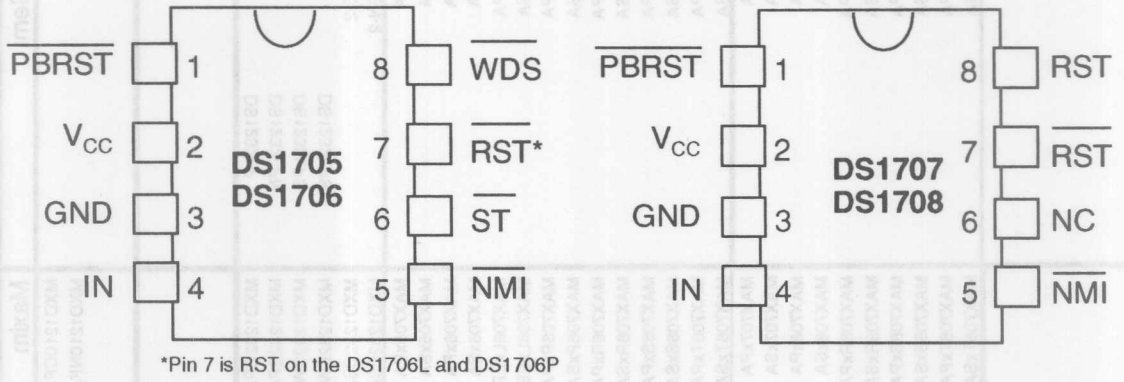
Applications

- Virtually any 3.3V (or 3.0V) microprocessor-based system
- Existing DS1232 applications moving to 3.3V

Product Preview

DS1705, DS1706x, DS1707, & DS1708x

MicroMonitors



*Pin 7 is RST on the DS1706L and DS1706P

The DS170x MicroMonitors are pin- and function-compatible with the Maxim MAX705, MAX706x, MAX707, and MAx708x family of µP supervisory circuits. The devices are designed specifically for power-sensitive designs and have a low 60 µA quiescent current maximum specification.

Key Features

- Active high and active low CMOS reset outputs
- 5% or 10% 5V tolerances
- 5%, 10%, and 20% 3.3V tolerances
- Watchdog (DS1705 & DS1706x only)
- Debounced pushbutton reset
- Low 60 µA quiescent current maximum
- All devices are spec'd at -40° to +85° C

Applications

- Virtually any 5V, 3.3V or 3.0V µP-based system
- Existing MAX705, MAX706x, MAX707, and MAx708x, or MAX813L applications

Dallas Semi		Maxim	Linear Tech.	Analog Dev.	California Micro	Crystal Semi.	Benchmarq
DS1210		MXD1210CPA			CM1210P		bq2201PN
DS1210N		MXD1210NPA			CM1210PI		bq2201PNN
DS1210S					CM1210S		
DS1210SN					CM1210SI		
DS1221							bq2204PN
DS1221N							bq2204PNN
DS1221S							bq2204SN
DS1221SN							bq2204SNN
DS1232	DS1232LP	MXD1232CPA	LTC1232CN8		CM1232P	CS1232-CP	
DS1232N	DS1232LPN	MXD1232EPA	LTC1232IN8		CM1232PI	CS1232-IP	
DS1232S	DS1232LPS	MXD1232CWA			CM1232S	CS1232-CS	
DS1232SN	DS1232LPSN	MXD1232EWA			CM1232SI	CS1232-IS	
DS1232LPS-2		MXD1232CSA	LTC1232CS8				
DS1232LPSN-2		MXD1232ESA	LTC1232IS8				
DS1705EPA		MAX705xPA		ADM705AN			
DS1705ESA		MAX705xSA		ADM705AR			
DS1706EPA		MAX706xPA		ADM706AN			
DS1706ESA		MAX706xSA		ADM706AR			
DS1706LEPA		MAX706LxEPA					
DS1706LESA		MAX706LxESA					
DS1706PEPA		MAX706PxPA		ADM1706PAN			
DS1706PESA		MAX706PxSA		ADM1706PAR			
DS1706REPA		MAX706RxPA		ADM1706RAN			
DS1706RESA		MAX706RxSA		ADM1706RAR			
DS1706SEPA		MAX706SxPA		ADM1706SAN			
DS1706SESA		MAX706SxSA		ADM1706SAR			
DS1706TEPA		MAX706TxPA		ADM1706TAN			
DS1706TESA		MAX706TxSA		ADM1706TAR			
DS1707EPA		MAX707xPA		ADM707AN			
DS1707ESA		MAX707xSA		ADM707AR			
DS1708EPA		MAX708xPA		ADM708AN			
DS1708ESA		MAX708xSA		ADM708AR			
DS1708REPA		MAX708RxPA		ADM1708RAN			
DS1708RESA		MAX708RxSA		ADM1708RAR			
DS1708SEPA		MAX708SxPA		ADM1708SAN			
DS1708SESA		MAX708SxSA		ADM1708SAR			
DS1708TEPA		MAX708TxPA		ADM1708TAN			
DS1708TESA		MAX708TxSA		ADM1708TAR			

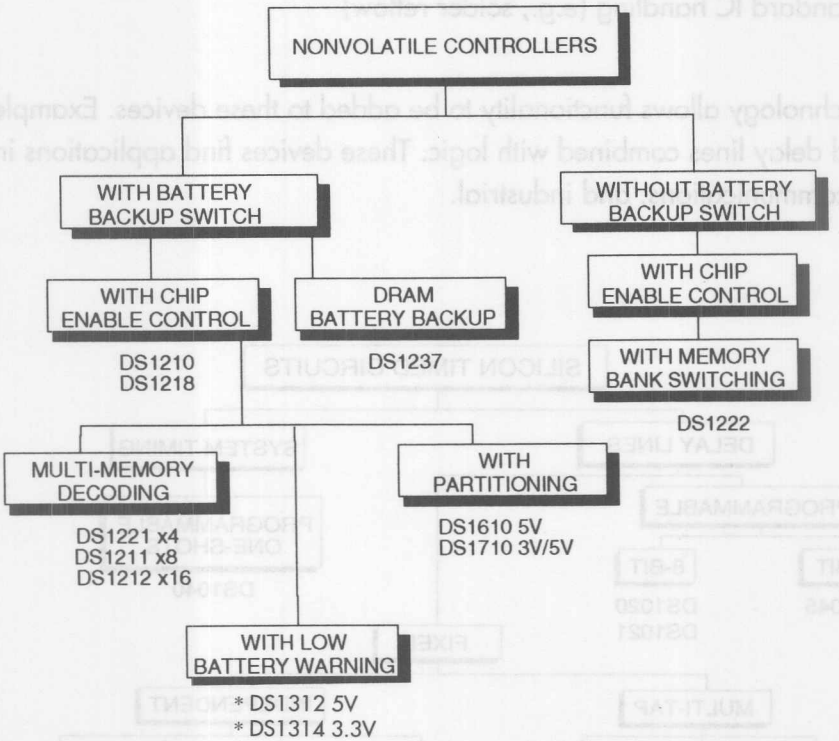
		TelCom
DS1810-5		TC54VC4812T
DS1810-10		TC54VC4512T
DS1810-15		TC54VC4412T
DS1815-10		TC54VC2812T
DS1815-20		TC54VC2512T

*x can be a "C" or "E"

Only true crosses with a high confidence factor.

Nonvolatile Controllers

Nonvolatile Controllers switch power between a primary supply and a secondary supply to allow SRAMs to maintain memory even in the absence of primary power. These devices also control chip enable to protect the SRAM from spurious writes when power is out of tolorance.



* products in development

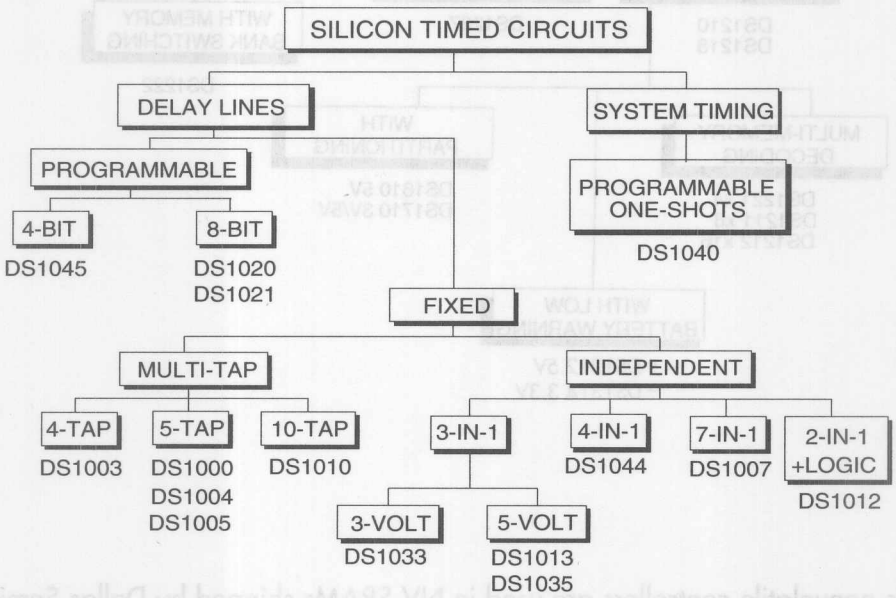
Dallas Semiconductor's nonvolatile controllers are used in NV SRAMs shipped by Dallas Semiconductor. The products above are tested and meet the same stringent requirements as those controllers used in NV SRAMs. This provides designers with a known quality level and the option to customize the RAM or battery to meet special design requirements.

Silicon Timed Circuits

Fixed delay lines are the core of the Silicon Timed Circuits family. These are all-silicon replacements for hybrid delay lines. The all-silicon delay lines offer a number of advantages over hybrid components:

- Increased reliability
- Smaller packaging (including DIP, SOIC, and TSSOP)
- Standard IC handling (*e.g.*, solder reflow)

The basic delay line IC technology allows functionality to be added to these devices. Examples include programmable delay lines, one-shots and delay lines combined with logic. These devices find applications in all market segments, especially computer, telecommunications, and industrial.



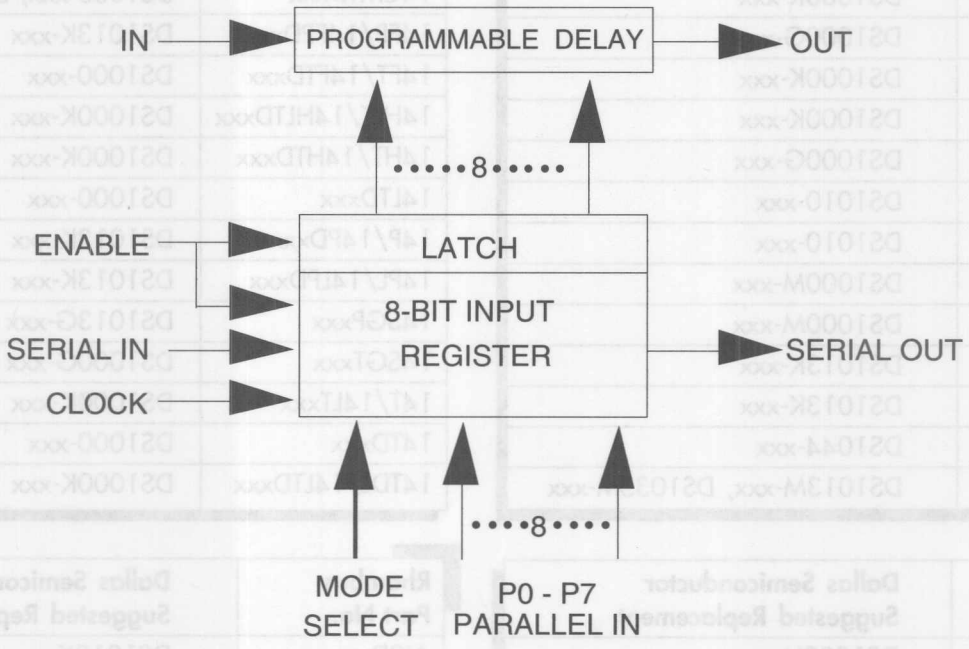
Applications

- Microprocessor and memory clock timing generation
- Optical networks
- Recovery of asynchronous data signals
- Laser and ultrasound control
- Overcoming timing mismatches between components
- Skew correction

Featured Product

DS1021
8-Bit Programmable Delay Line

Functional Block Diagram



Key Features

- Programmable over 256 steps in increments of 0.25 or 0.5ns
- Guaranteed monotonicity simplifies system design
- Serial (3-wire) or parallel (8-bit) programmability for system flexibility
- Cascadable for longer delays
- 16-pin, 300-mil SOIC packaging for board space savings

Applications

- Configurable as delay line, pulse width modulator or oscillator
- Optical networks
- Laser or ultrasound control

Cross Reference

Data Delay Part No.	Dallas Semiconductor Suggested Replacement
DDU-3J-5xxx	DS1000-xxx
DDU-4C-5xxx	DS1000K-xxx
DDU-4F-5xxx	DS1000K-xxx
DDU-6-xxx	DS1000K-xxx
DDU-66-xxx	DS1000K-xxx
DDU-66-xxxA	DS1000G-xxx
DDU-66C-xxx	DS1000K-xxx
DDU-66F-xxx	DS1000K-xxx
DDU-66F-xxxA	DS1000G-xxx
DDU-7F-xxx	DS1010-xxx
DDU-7J-xxx	DS1010-xxx
DDU-8C-xxx	DS1000M-xxx
DDU-8F-5xxx	DS1000M-xxx
MDU-3C-xxx	DS1013K-xxx
MDU-3F-xxx	DS1013K-xxx
MDU-4F-xxx	DS1044-xxx
MDU-38F-xxx	DS1013M-xxx, DS1035M-xxx

ESC Part No.	Dallas Semiconductor Suggested Replacement
8SGTxxx	DS1000H-xxx
8T25/8TDxxx	DS1000M-xxx
10SGTxxx	DS1010G-xxx
10T/10TDxxx	DS1010-xxx
14CMTDxxx	DS1000-xxx, DS1000K-xxx
14FP/14FPDxxx	DS1013K-xxx
14FT/14FTDxxx	DS1000-xxx
14HLT/14HLTDxxx	DS1000K-xxx
14HT/14HTDxxx	DS1000K-xxx
14LTDxxx	DS1000-xxx
14P/14PDxxx	DS1013K-xxx
14PL/14LPDxxx	DS1013K-xxx
14SGPxxx	DS1013G-xxx
14SGTxxx	DS1000G-xxx
14T/14LTxxx	DS1000K-xxx
14TDxxx	DS1000-xxx
14TDL/14LTDxxx	DS1000K-xxx

Belfuse Part No.	Dallas Semiconductor Suggested Replacement
A423-0xxx-02	DS1000H-xxx
A447-0xxx-A1	DS1000K-xxx
A447-0xxx-A3	DS1013K-xxx
A447-0xxx-02	DS1000K-xxx
A447-0xxx-09	DS1000K-xxx
A447-0xxx-10	DS1010-xxx
A463-0xxx-02	DS1000M-xxx
0447-0xxx-02	DS1000K-xxx
0450-0xxx-02	DS1000K-xxx
S422-0xxx-10	DS1010G-xxx
S423-0xxx-02	DS1000H-xxx

Consult individual data sheets for exact matches of delay timing and/or packaging.

For cross references to part numbers not listed, please contact the factory at (214) 450-5348 or fax us at (214) 450-3717.

Rhombus Part No.	Dallas Semiconductor Suggested Replacement
AI3D-xxx	DS1013K-xx
AI3D-xxG	DS1013G-xx
AIDL-xxx	DS1000K-xxx (C)
AIDL-xxxG	DS1000G-xxx (C)
AIDM-xxx	DS1000K-xxx
AIDM-xxxG	DS1000G-xxx
AITD-xxx	DS1010-xxx
AITD-xxxG	DS1010G-xxx
AMDL-xxx	DS1000M-xxx
AMDL-xxxG	DS1000H-xxx
AMDM-xxx	DS1000M-xxx
AMDM-xxxG	DS1000H-xxx
D2TZMI-xxx	DS1010-xxx
DTZMI-xxx	DS1000K-xxx
FDM-xxx	DS1000M-xxx
FSDM-xxx	DS1000Q-xxx (C)
MSDM-xxx	DS1013K-xx
SDM-xxx	DS1000M-xxx

(C) = Custom Delay

Cross Reference

Datatronics Part No.	Dallas Semiconductor Suggested Replacement
DL106x, 107x	DS1000M-yyy
DL610x, 611x	DS1000K-yyy
DL613x, 614x	DS1013K-yyy
DL620x	DS1000C-yyy (C)
DL622x, 623x	DS1000K-yyy
DL628x	DS1010-yyy
DL630x, 631x	DS1000K-yyy
DL633x, 634x	DS1000Q-yyy (C)
DL635x, 637x, 638x	DS1000K-yyy
DL651x, 652x, 658x	DS1000K-yyy
DL67xx	DS1010-yyy
SM61xx	DS1010G-yyy

Kappa Part No.	Dallas Semiconductor Suggested Replacement
DL14CBxxx	DS1000K-yyy
DL15CCxxx	DS1010-yyy
DL34CBxxx	DS1013-yyy
DT08CBxxx	DS1000M-yyy
DT13CBxxx	DS1000Q-yyy (C)
DT14CBxxx	DS1000K-yyy
DT15CCxxx	DS1010-yyy
DT16CBxxx	DS1000-yyy (C)
DT34CBxxx	DS1013K-yyy
DT38CBxxx	DS1013M-yyy
HCL14CBxxx	DS1000K-yyy
HCT14CBxxx	DS1000K-yyy
LD14CBxxx	DS1000K-yyy
LDS14CBxxx	DS1000K-yyy
LDS34CBxxx	DS1013-yyy
LS14CBxxx	DS1000K-yyy
LT14CBxxx	DS1000K-yyy
SMT08CBxxx	DS1000H-yyy
SMT14CBxxx	DS1000G-yyy
SMT44CBxxx	DS1044G-yyy

(C) = Custom Delay

Consult individual data sheets for exact matches of delay timing and/or packaging.

For cross references to part numbers not listed, please contact the factory at (214) 450-5348 or fax us at (214) 450-3717.

PCA Part No.	Dallas Semiconductor Suggested Replacement
EP82xx	DS1000K-yy
EP83xx	DS1010-yy
EP87xx	DS1000K-yy
EP93xx	DS1000K-yy

xx	yy	xx	yy
00	25	28	101 (C)
01	50	29	750(C)
02	100	30	550 (C)
03	150	70	50
04	200	71	55 (C)
05	250	72	60
06	300 (C)	73	65 (C)
07	350	74	70 (C)
08	400 (C)	75	75
09	450	76	80 (C)
10	500	77	85 (C)
11	60	78	90 (C)
13	30	79	95 (C)
14	35	80	100
15	40	81	125
16	45	82	150
17	75	83	175
18	420 (C)	84	200
19	125	85	225
20	175	86	250
21	225 (C)	87	275
22	440 (C)	88	300 (C)
23	470 (C)	89	350
24	600 (C)	90	400
25	700 (C)	91	450

EP9206-xxx	DS1013K-xxx*
EP9458-xx	DS1000M-xx
EP9810-xxx	DS1000K-xxx
EPA073-xxx	DS1000G-xxx
EPA189-xxx	DS1013K-xxx
EPA220-xxx	DS1000K-xxx
EPA249-xxx	DS1013M-xxx DS1035M-xxx
EPA280-xxx	DS1013G-xxx
EPA313-xxx	DS1013K-xxx
EPA366-xxx	DS1044G-xxx
EPA445-xxx	DS1013-xxx
EPA460-xxx	DS1010-xxx
EPA810-xxx	DS1000Q-xxx (C)
EPA1140-xxx	DS1000H-xxx

(C) = Custom Delay

*10ns delays and slower. For shorter delays the DS1035M is functionally equivalent, but not pin-compatible.

Cross Reference

Pulse Part No.	Dallas Semiconductor Suggested Replacement
2119x, 2121x	DS1000K-yyy
2126x, 2127x	DS1013-yyy
2134x, 2138x	DS1000K-yyy
2141x, 2142x	DS1000-yyy
21468	DS1000K-25
21712	DS1000K-125
21741	DS1000K-60
2178x, 2179x	DS1010-yyy
2181x, 2182x	DS1000K-yyy
2190x, 2191x	DS1000M-yyy
2400x, 2401x	DS1000-yyy
2403x, 2404x	S1000M-yyy
2403xW, 2404xW	S1000H-yyy
24048W	S1000G-75
2405xW, 2406xW	S1000G-yyy
2411x	DS1010-yyy
2411xW	DS1010G-yyy

Technitrol Part No.	Dallas Semiconductor Suggested Replacement
HTTLDLxxx	DS1000M-xxx (PKG#3)
	DS1000H-xxx (PKG#3A)
LTLDDxxx	DS1010-xxx
LTTLDDxxx	DS1010G-xxx
LTTLDLxxx	DS1000K-xxx (PKG#2)
	DS1000G-xxx (PKG#2A)
TTL2Sxxx	DS1013K-xxx (C)
TTL3Sxxx	DS1013K-xxx (C)
TTLDDxxx	DS1010-xxx
TTLDLxxx	DS1000K-xxx (C)

(C) = Custom Delay

Valor Part No.	Dallas Semiconductor Suggested Replacement
DL1846	DS1000K-175
DL188x	DS1000K-yyy
DL2060	DS1000K-300 (C)
DL2061	DS1000K-400 (C)
DL2080-2084	DS1000K-yyy
DL2086-2097	DS1000-yyy
DL2171	DS1000K-60
DL218x	DS1010-yyy
DL22xx	DS1013K-yyy
DL2325	DS1013K-65
DL2328	DS1013K-60
DL233x	DS1000K-yyy
DL2349	DS1013K-200
DL235x	DS1013K-yyy
DL2425	DS1013K-12
DL2427	DS1000K-80 (C)
DL2437	DS1000K-225 (C)
DL244x, DL245x	DS1013K-yyy
DL30xx	DS1000M-yyy
DL315x	DS1010-yyy
DL32xx	DS1013M-yyy, DS1035M-yyy
DL600x, DL601x	DS1000K-yyy
DL604x, DL605x	DS1000M-yyy
DL904x, DL905x	DS1000M-yyy
DL907x, DL908x	DS1000-yyy
SG0xxx	DS1010G-xxx
SG5xxx	DS1000G-xxx
SG904x, SG905x	DS1000H-yyy
SG907x, SG908x	DS1000G-yyy

(C) = Custom Delay

Consult individual data sheets for exact matches of delay timing and/or packaging.

For cross references to part numbers not listed, please contact the factory at (214) 450-5348 or fax us at (214) 450-3717.

Selection Tables

TAPPED DELAY LINES

Part Number	# Taps	Tap 1 Delay (ns)	Tap Increment (ns)	Total Delay (ns)	Supply Voltage (V)	Packages	Applications
DS1000	5	4-100	4-100	20-500	5	8, 14-Pin DIP 8-Pin SOIC	General Purpose
DS1004	5	5	2,3,4,5	13,17, 21, 25	5	8-Pin DIP, SOIC	General Purpose
DS1005	5	12-50	12-50	60-250	5	8, 14-Pin DIP 16-Pin SOIC	General Purpose
DS1010	10	5-100	5-100	50-1000	5	14-Pin DIP 16-Pin SOIC	General Purpose
DS1003	4	6, 8	4, 4.5, 6, 8, 10	14, 15, 20, 22, 24	5	8,14-Pin DIP	RISC Microprocessors

INDEPENDENT MULTIPLE DELAY LINES

Part Number	# Delays	Delay Values	Supply Voltage	Packages	Applications
DS1013	3	10-200	5	8, 14-Pin DIP 16-Pin SOIC	General Purpose
DS1033	3	8-30	3	8-Pin DIP, SOIC 20-Pin TSSOP	3V or Portable Systems
DS1035	3	6-30	5	8-Pin DIP, SOIC 20-Pin TSSOP	General Purpose
DS1044	4	5-25	5	14-Pin DIP, SOIC	General Purpose
DS1007	7	3-10, 9-40	5	16-Pin DIP, SOIC	General Purpose

PROGRAMMABLE DELAYS

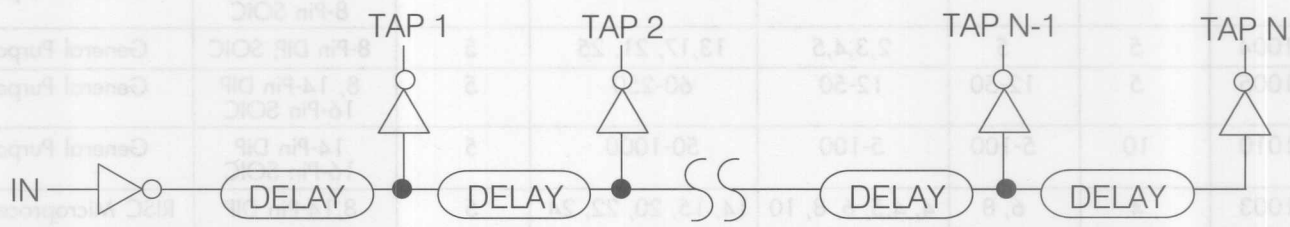
Part Number	Resolution	Step Zero Delay	Step Sizes (ns)	Max Delay (ns)	Supply Voltage (V)	Packages	Applications
DS1020	8 Bits	10	0.15, 0.25 0.5, 1, 2	48, 74, 138 265, 520	5	16-Pin DIP, SOIC	Laser, Optical, Networking, Ultrasonic Control
DS1021	8 Bits	10	0.25, 0.5	74, 138	5	16-Pin SOIC	
DS1045	Dual 4-Bit	9	2, 3, 4, 5	39, 54, 69, 84	5	16-Pin DIP, SOIC	

SYSTEM TIMING FUNCTIONS

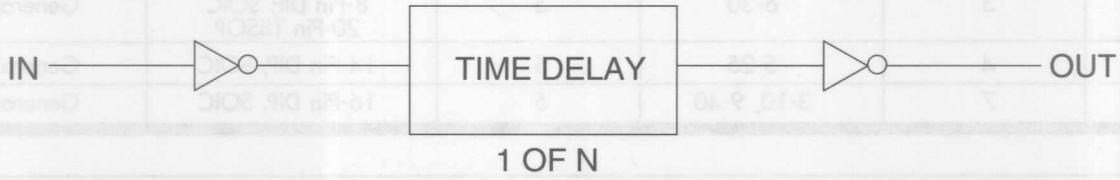
Part Number	Description	Timing Range	Packages	Applications
DS1012	2-Input, 4-Output Multiple Delays w/Logic	3-40ns Delays	8-Pin DIP, SOIC	Frequency Doubler General Purpose
DS1040	Programmable 1-Shot	5-500ns Pulse Width	8-Pin DIP, SOIC	Pulse Width Modulator Clock Oscillator

Functional Block Diagrams

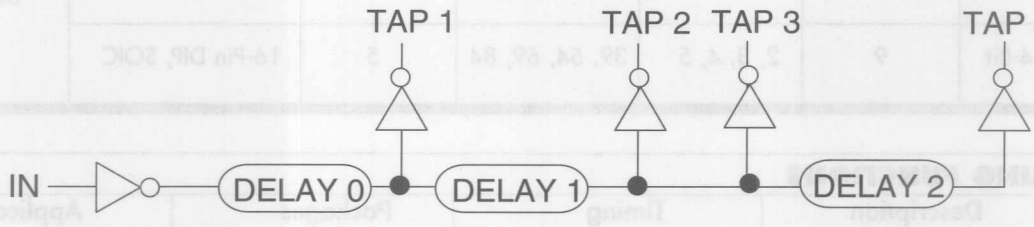
Multiple Tap Delays: DS1000; DS1004; DS1005 (N=5); DS1010 (N=10)



Multiple Independent Delays: DS1013; DS1033; DS1035 (N=3); DS1044 (N=4); DS1007 (N=7)

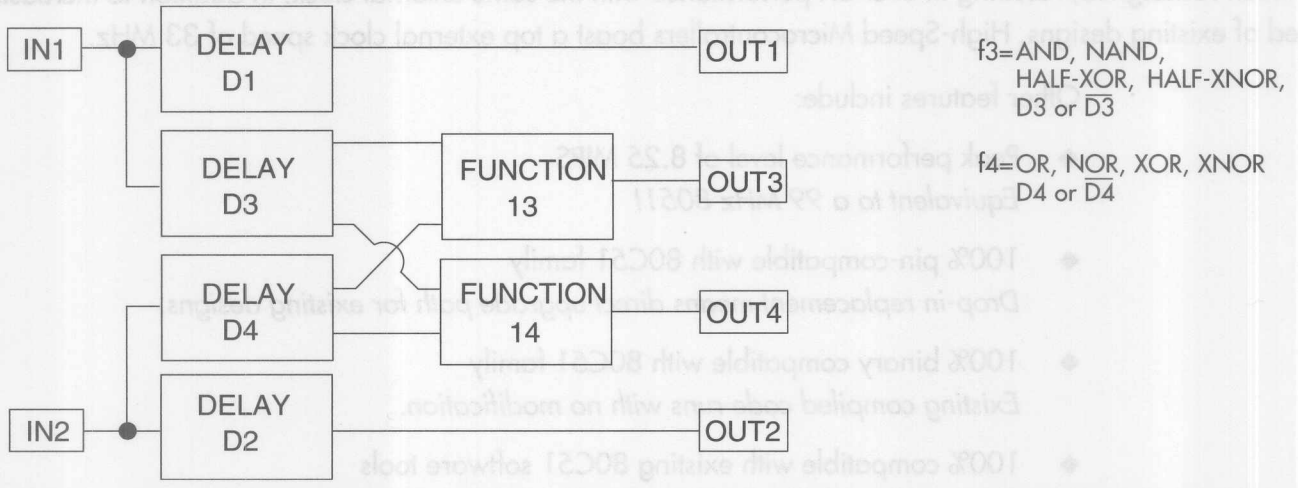


DS1003 4-Tap Silicon Delay Line for RISC Applications



Functional Block Diagram

DS1012 2-in-1 Sub-Miniature Delay Line with Logic



High-Speed Microcontrollers

Dallas Semiconductor's High-Speed Microcontrollers are direct performance upgrades for the 8051, one of the most popular microcontrollers in the world. We recreated the heart of the microprocessor, doing in only 4 clock cycles what has traditionally taken 12 clock cycles. Designed to be drop-in upgrades, the High-Speed Micros' core has been redesigned, resulting in over 3X performance with the same external clock. In addition to increasing the speed of existing designs, High-Speed Microcontrollers boast a top external clock speed of 33 MHz.

Other features include:

- Peak performance level of 8.25 MIPS
  Equivalent to a 99 MHz 8051!
- 100% pin-compatible with 80C51 family
  Drop-in replacement means direct upgrade path for existing designs.
- 100% binary compatible with 80C51 family
  Existing compiled code runs with no modification.
- 100% compatible with existing 80C51 software tools
  Compatible with existing high-level language software tools.

Why Upgrade?

16-bit performance at an 8-bit price

- You don't have to redesign around an expensive 16-bit processor for high-performance designs. The increased speed of the High-Speed Microcontroller family means that you can get the performance you need without paying for what you don't need.

Reduce power without sacrificing performance

- Because the High-Speed Microcontroller is more efficient than a traditional 8051, the crystal speed and power consumption can be reduced without sacrificing performance. In addition, many devices incorporate power-saving features, such as new low-power modes and a low-current ring oscillator.

Upgrade your software, not your hardware

- New software features can be accommodated without a costly redesign of the system hardware, getting you to market faster and allowing room for future expansion.

More speed, less EMI

- The improved efficiency of the High-Speed Microcontroller dramatically reduces electromagnetic interference (EMI). The EMI reduction mode means that it won't wreak havoc with nearby electronic systems.

Features, Features, Features

- Our dual UARTs, watchdog timer, precision reset circuitry, and a host of other features allow you to consolidate your design, saving money, time and PCB real estate.

Enhanced Feature Set

New systems demand not just increased speed, but increased functionality. The High-Speed Microcontroller family incorporates enhanced features and peripherals that simplify circuit design and reduce overall system cost. Some of the features available in High-Speed Microcontrollers include:

- Up to 14 interrupts, including 6 external
- 3 16-bit timers
- 256 bytes scratchpad RAM
- 1KB on-chip MOVX SRAM
- 2 data pointers
- 2 high-speed UARTs
- Power-fail monitor
- Precision reset circuitry
- Watchdog timer
- Real time clock
- Nonvolatile SRAM
- Power management modes
- Low-power ring oscillator

Available Options

- Commercial temperature range 0°C to 70°C
- Industrial temperature range -40°C to 85°C
- ROMless
- EPROM (UV-erasable and One-Time Programmable [OTP])
- Mask ROM
- 3V operation

Applications

Applications for the High-Speed Microcontroller family include any system where high performance and/or low-power are important:

- Telecommunications
- Industrial controls
- System supervision
- Data logging
- Motor control
- Hand-held/portable devices

Featured Products

DS80C320 Microcontroller

High-Speed Microcontroller upgrade for 80C31/80C32.

- High-speed core
- 13 interrupts, including 6 external
- 3 16-bit timers
- 256 bytes scratchpad RAM
- 2 data pointers
- 2 high-speed UARTs
- Power-fail monitor
- Precision reset circuitry
- Watchdog timer

DS87C520 Microcontroller

High-Speed EPROM Microcontroller upgrade for 87C51FX.

- High-speed core
- 16KB EPROM
- 13 interrupts, including 6 external
- 3 16-bit timers
- 256 bytes scratchpad RAM
- 2 data pointers
- 2 high-speed UARTs
- Power-fail monitor
- Precision reset circuitry
- Watchdog timer
- 1KB on-chip MOVX SRAM
- Power management modes

DS87C530 Microcontroller

The DS87C530 High-Speed EPROM Microcontroller is the first 8051 derivative to incorporate a real time clock. In conjunction with an external lithium power source and watch crystal, this provides the processor direct access to timekeeping registers, eliminating the need for dedicated I/O lines. In addition to 16 kbytes of EPROM program storage, the on-chip SRAM is battery backed, providing nonvolatile data storage.

- High-speed core
- 14 interrupts, including 6 external
- 3 16-bit timers
- 256KB scratchpad RAM
- 16KB EPROM
- 1KB on-chip nonvolatile MOVX SRAM
- 2 data pointers
- 2 high-speed UARTs
- Power-fail monitor
- Precision reset circuitry
- Watchdog timer
- Real time clock
- Power management modes
- Low-power ring oscillator

Featured Products

DS80C310 Microcontroller

The DS80C310 is a High-Speed Microcontroller upgrade for the 80C31/80C32. It is a reduced feature set version of the DS80C320, designed for cost-sensitive applications.

- High-speed core
- 10 interrupts, including 6 external
- 3 16-bit timers
- 256 bytes scratchpad RAM
- 2 data pointers
- 1 high-speed UART

DS80C323 Low-Power Microcontroller

The DS80C323 is a low-power version of our popular DS80C320 High-Speed Microcontroller. It will operate from 2.7V to 5.5V.

DS83C520 Microcontroller

The DS83C520 is a 16KB factory mask ROM version of our popular DS87C520 High-Speed Microcontroller.

Selection Table

Device	High Speed Core	ROM	RAM	On-chip MOVX SRAM	Serial I/O	Timer Counter	External Interrupts	Power Mgmt. Mode	EMI Reduction Mode	Precision Reset/ Power-fail Interrupt	Data Pointers (16-bit)	Real Time Clock	Operating Voltage	Packages
DS80C310	✔	—	256	—	1	3	6				2		4.5V-5.5V	DIP-40 PLCC-44 TQFP-44
DS80C320	✔	—	256	—	2	3+ Watchdog	6			✔	2		4.5V-5.5V	DIP-40 PLCC-44 TQFP-44
DS80C323	✔	—	256	—	2	3+ Watchdog	6			✔	2		2.7V-5.5V	DIP-40 PLCC-44 TQFP-44
DS83C520	✔	16KB Mask ROM	256	1KB	2	3+ Watchdog	6	✔	✔	✔	2		4.5V-5.5V	DIP-40 PLCC-44 TQFP-44
DS87C520	✔	16KB EPROM	256	1KB	2	3+ Watchdog	6	✔	✔	✔	2		4.5V-5.5V	DIP-40 PLCC-44 TQFP-44
DS87C530	✔	16KB EPROM	256	1KB	2	3+ Watchdog	6	✔	✔	✔	2	✔	4.5V-5.5V	PLCC-52

Secure Microcontrollers

The Secure Microcontroller family features 8051-compatible microcontrollers based on nonvolatile RAM rather than ROM for program and data storage. Using NV RAM in a microcontroller provides in-system reprogrammability; software security; and data collection ability. Secure Microcontrollers are available as monolithic microcontrollers or as modules that combine the micro, SRAM, and a lithium cell in a single package.

Key Features

- Fully 8051 compatible
  - 8051 instruction set
  - Four 8-bit pseudo-bi-directional I/O ports
  - 128 bytes scratchpad RAM
  - Two 16-bit timer/counters
  - One UART
- Enhanced features for reliability and ease-of-use
  - Non-multiplexed, bytewide address/data bus for memory access
  - Nonvolatile SRAM control guaranteed for 10+ years of data retention
  - Partitioned code and data segments
  - Power-fail reset/power-fail interrupt
  - Precision watchdog timer
  - ROM-based serial bootstrap loader allows in-system reprogramming
- Optional features in various family members include
  - Firmware security
  - Real-time clock
  - Random number generator
  - CRC hardware for checking memory validity
  - 8042-style reprogrammable peripheral controller (RPC) mode
- Modules guarantee 10+ years of data retention in the absence of external power

Featured Products

DS5000FP Soft Microcontroller Chip

The DS5000FP is the original Soft Microcontroller Chip in an 80-pin QFP (Quad Flat Pack). It adds the following to the basic family features described above:

- Nonvolatile control for 8K x 8 or 32K x 8 SRAMs
- Partitions one SRAM into program and data areas, and write protects the program segment
- Decodes memory for up to two 32K x 8 SRAMs
- Optional security features
  - Real-time memory encryption
  - 48-bit user-selected encryption key
  - Security lock destroys memory if unlocked
  - Interrupt vector table hidden on-chip

DS5000/DS5000T Soft Microcontrollers

The DS5000 and DS5000T incorporate the DS5000FP, RAM, lithium battery, and optional real-time clock in a 40-pin DIP module with an 8051 footprint and pinout.

- Built-in 8KB or 32KB of NV RAM
- Partitions memory into program and data areas, and write protects the program segment
- Optional internal real-time clock ("T" option)
- Incorporates the DS5000FP optional security features

DS2250/DS2250T Soft Microcontroller Stiks

The DS2250 and DS2250T have the identical feature set as the DS5000, but in a SIMM form factor. This package change allows up to 64KB of NV RAM instead of 32KB. The second 32KB of memory is restricted to data memory.

Featured Products

DS5001FP Soft Microcontroller Chip

The DS5001FP provides the base feature set of the DS5000FP with the following additions:

- Accesses up to 128KB on the bytewide bus
- Decodes memory for 32K x 8 or 128K x 8 SRAMs
- Four additional decoded peripheral enables
- CRC hardware for checking program validity
- 8042-style Reprogrammable Peripheral Controller (RPC) mode
- Bandgap reference for more accurate power monitoring
- Note: the DS5001FP has no memory encryption feature

DS2251T Soft Microcontroller Stik

The DS2251T is a 72-pin SIMM based on the DS5001FP. It provides up to 128KB of onboard NV RAM and a real-time clock. A bytewide bus is available at the connector. This is used with the decoded peripheral enables for memory mapped external peripherals such as a UART or A/D converter. The real-time clock has interrupt capability.

Featured Products

DS5002FP Soft Microcontroller Chip

The DS5002P is a highly secure version of the DS5001FP. It combines the operating features of the DS5001FP with the following enhancements to the DS5000FP security features:

- Security is active at all times
- Improved memory encryption using a 64-bit encryption key
- Automatic random generation of encryption keys
- Self-destruct input for tamper protection
- Die top coating prevents microprobe (DS5002FPM)

DS2252T Soft Microcontroller Stik

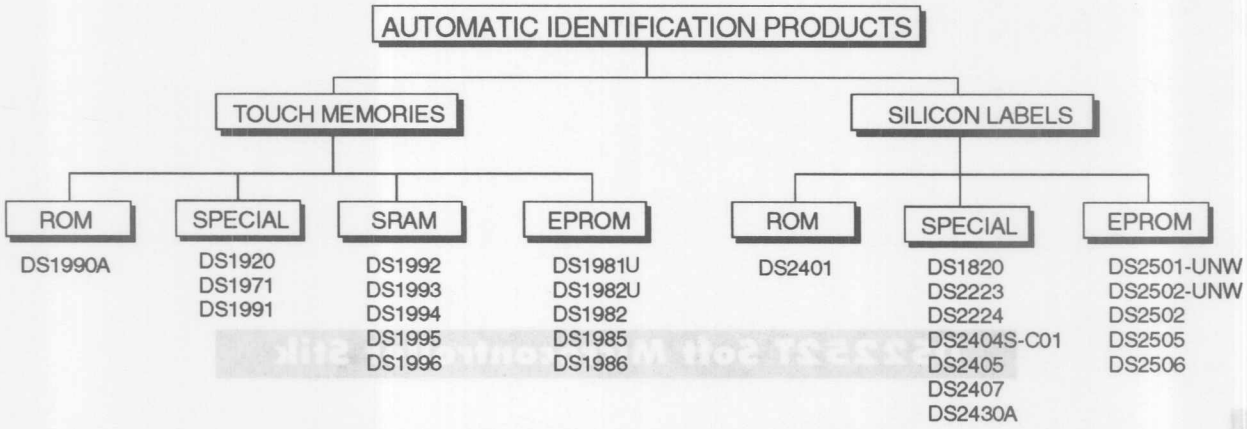
The DS2252T is a 40-pin SIMM based on the DS5002FP. It provides up to 128KB of onboard secure NV RAM with a real-time clock. The memory is highly secure from tampering and from competitors.

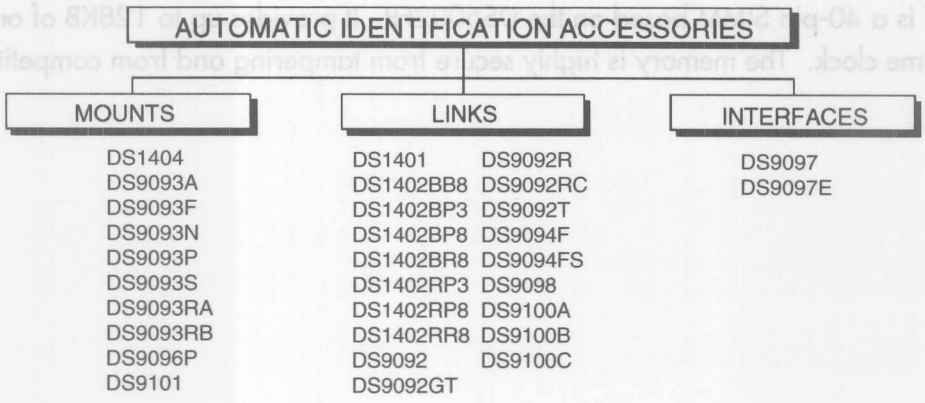
Automatic Identification

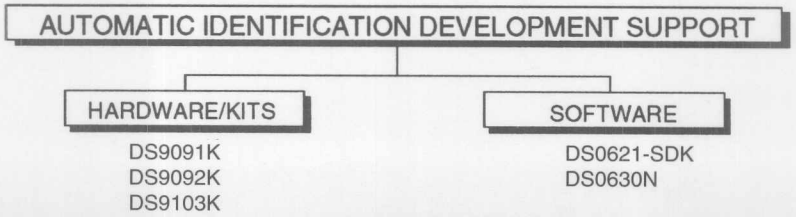
Touch Memories are the core of the Automatic Identification product line, chips housed in a stainless steel MicroCan™. The MicroCan serves two purposes: electrical contact and protection from the environment. Each Touch Memory proves its identity by its unique registration number. The contents of the Touch Memory™ can be changed while attached to an object. Unlike bar codes, Touch Memories can be read or written without expensive electro-optical equipment. Packaged in solder-mount packages, Automatic Identification products function as Silicon Labels™. These devices find applications as re-writeable data carriers in many market segments, such as:

- Access control
- Asset management
- Personal identification
- Manufacturing
- Time/attendance control

They also serve as electronic labels storing manufacturing history, revision status and other important information on products to which they are attached.







Featured Products

DS1994
Touch Memory™ Plus Time

Key Features

- Smallest real time clock and memory module with over 10 years of permanent operation
- Interval timer can automatically accumulate time when power is applied
- Programmable cycle counter can accumulate the number of system power-on/off cycles
- Programmable alarms can be set to generate interrupts for interval timer, real time clock and/or cycle counter
- Write-protect feature provides tamper-proof time data
- Programmable expiration date limits access to SRAM and timekeeping
- Clock accuracy is better than ±2 minutes/month at 25°C

Applications

- Stopwatch, alarm clock, calendar
- Time and date stamping of events
- Run time meter (power cycles, hours) for equipment
- Time-restricted access control
- Expiration controller for leased equipment
- Interval timer, event scheduler for maintenance

DS1986
64K Bit Add-Only Touch Memory™

Key Features

- 65,536-bit Electrically Programmable Read Only Memory (EPROM)
- Each memory page can be permanently write-protected to prevent tampering
- Device is an "add-only" memory where additional data can be programmed into EPROM without disturbing existing data
- Architecture allows software to patch data by superseding an old page in favor of a newly programmed page
- Reads over a wide voltage range of 2.8V to 6.0V from -40°C to +85°C; programs at 11.5V ±0.5V from -20°C to +50°C

Applications

- On-line storage of manufacturing history
- Storage of equipment revision status and material used
- Storage of calibration constants
- Electronic personal identification
- Electronic ticket or debit token

Featured Products

DS1920
Touch Thermometer™

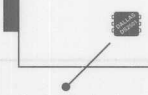
Key Features

- Digital thermometer measures temperatures from -55°C to +100°C typically in 1 second
- Accuracy ±0.5°C within 0°C to +70°C, no calibration or reference required
- Zero standby power
- Power supply through data contact
- Access to internal counters allows increased resolution through interpolation
- Two bytes of EEPROM for use as alarm triggers or user memory
- Built-in network controller supports alarm search to directly identify devices sensing alarming temperatures
- Device-generated 8-bit CRC for on-the-fly data integrity check

Applications

- HVAC environmental controls
- Thermostatic controls
- Sensing temperature in buildings, equipment or machinery
- In-process thermal monitoring and control
- Thermodynamic research of temperature profiles
- Fire alarm and sprinkler systems

UniqueWare™ Devices


(actual size)

Key Features

- 512-bit or 1024-bit 1-Wire EPROM is factory programmed and serialized according to customer-supplied information and then write-protected
- Dallas Semiconductor handles serialization and bookkeeping for tracking the last number used
- Up to 57 bytes (512-bit device) or 121 bytes (1024-bit device) of user-defined information, including serialization
- Customer-specific project ID number together with custom ROM for highest level of product security
- Programmed devices are made available only to the owner of the project ID or their authorized agents
- Minimum order size 500 pieces; no NRE charge, short lead-time
- Wide operating voltage range (2.8V to 6.0V) and industrial temperature range (-40°C to +85°C)
- Available as DS2501-UNW (512-bit) or DS2502-UNW (1024-bit) Silicon Label and DS1981U (512-bit) or DS1982U (1024-bit) UniqueWare Touch Memory

Applications

- After-market protection of products by restricted availability
- Node ID for network cards (IEEE-assigned number)
- Wireless phone ID plus battery information
- Electronic product identification label with serialization

Featured Products

DS2407
Dual Addressable Switch Plus 1K-Bit Memory

Key Features

- Dual, open-drain PIO read/write channels are remotely controlled over 1-Wire bus
- Channel A sink capability of 50 mA at 0.4V; channel B 8 mA at 0.4V
- Maximum operating voltage of 13V at PIO-A, 6.5V at PIO-B
- Activity latch with each channel to capture short pulses
- 1024 bits user-programmable OTP EPROM
- Operates over a wide voltage range of 2.8V to 6.0V from -40°C to +85°C
- Supports conditional search with user-programmable condition
- Low cost TO-92 (Channel A only) or 6-pin C-Lead surface mount package

Applications

- Automation in homes, laboratories or factories
- Burglar alarms
- Irrigation controls
- Greenhouses
- Vending machines

Selection Tables

Touch Family

Part Number	Description	Registration #	Memory	MicroLAN™	Packages
DS1920	Touch Thermometer	8+48+8 Bits ROM	16 Bits EEPROM	YES	F50
DS1971	EEPROM Touch Memory	8+48+8 Bits ROM	256+64 Bits EEPROM	YES	F30, F50
DS1981U	UniqueWare Touch Memory	8+48+8 Bits ROM	512 Bits EPROM	YES	F30, F50
DS1982U	UniqueWare Touch Memory	8+48+8 Bits ROM	1024 Bits EPROM	YES	F30, F50
DS1982	Add-only Touch Memory	8+48+8 Bits ROM	1024 Bits EPROM	YES	F30, F50
DS1985	Add-only Touch Memory	8+48+8 Bits ROM	16384 Bits EPROM	YES	F30, F50
DS1986	Add-only Touch Memory	8+48+8 Bits ROM	65536 Bits EPROM	YES	F30, F50
DS1990A	Touch Serial Number	8+48+8 Bits ROM	—	YES	F30, F50
DS1991	Touch Multikey, 3 Secure Partitions	8+48+8 Bits ROM	1344 Bits NV RAM	YES	F50
DS1992	Touch Memory	8+48+8 Bits ROM	1024 Bits NV RAM	YES	F50
DS1993	Touch Memory	8+48+8 Bits ROM	4096 Bits NV RAM	YES	F50
DS1994	Touch Memory + Time	8+48+8 Bits ROM	4096 Bits NV RAM	YES	F50
DS1995	Touch Memory	8+48+8 Bits ROM	16384 Bits NV RAM	YES	F50
DS1996	Touch Memory	8+48+8 Bits ROM	65536 Bits NV RAM	YES	F50

Silicon Labels™

Part Number	Description	Registration #	Memory	MicroLAN™	Packages
DS1820	1-Wire Thermometer	8+48+8 Bits ROM	16 Bits EEPROM	YES	PR-35, SSOP
DS2223	EconoRAM	—	256 Bits RAM	NO	TO-92, SOT-223
DS2224	EconoRAM + ROM	32 Bits ROM	224 Bits RAM	NO	TO-92, SOT-223
DS2401	Silicon Serial Number	8+48+8 Bits ROM	—	YES	TO-92, SOT-223, TSOC
DS2404S-C01	Dual-port Memory + Time	8+48+8 Bits ROM	4096 Bits RAM	YES	16-Pin SOIC
DS2405	Addressable Switch	8+48+8 Bits ROM	—	YES	TO-92, SOT 223, TSOC
DS2407	Dual Addressable Switch + Memory	8+48+8 Bits ROM	1024 Bits EPROM	YES	TO-92, TSOC
DS2430A	1-Wire EEPROM	8+48+8 Bits ROM	256+64 Bits EEPROM	YES	TO-92, TSOC
DS2501-UNW	Uniqueware	8+48+8 Bits ROM	512 Bits RAM	YES	TO-92, TSOC, SOIC
DS2502-UNW	Uniqueware	8+48+8 Bits ROM	1024 Bits RAM	YES	TO-92, TSOC, SOIC
DS2502	Add-only Memory	8+48+8 Bits ROM	1024 Bits EPROM	YES	TO-92, SOIC, TSOC
DS2505	Add-only Memory	8+48+8 Bits ROM	16384 Bits EPROM	YES	TO-92, TSOC
DS2506	Add-only Memory	8+48+8 Bits ROM	65536 Bits EPROM	YES	PR-35

Selection Tables

Accessories

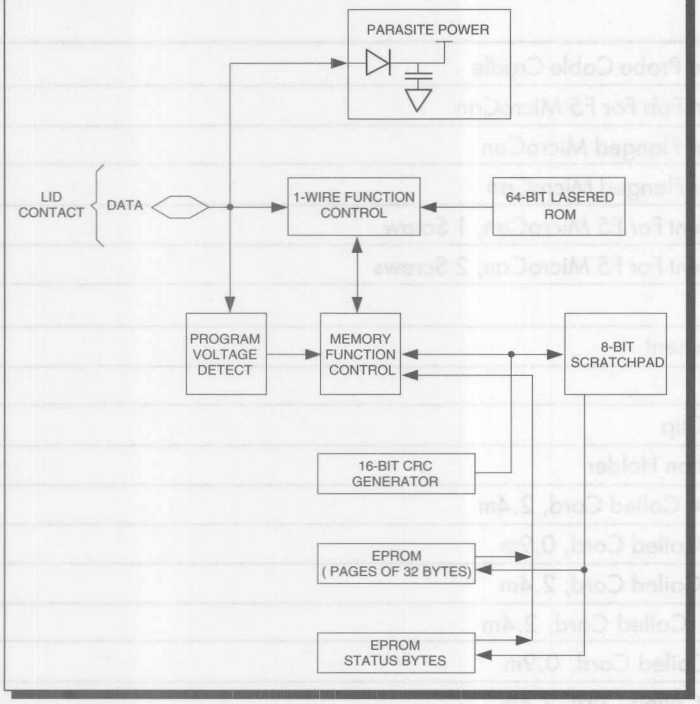
Part Number	Category	Description
DS1404	Mount	Touch and Hold Probe Cable Cradle
DS9093A	Mount	Angled Snap-In Fob For F5 MicroCan
DS9093F	Mount	Snap-In Fob For Flanged MicroCan
DS9093N	Mount	Angled Fob For Flanged MicroCan
DS9093P	Mount	Permanent Mount For F5 MicroCan, 1 Screw
DS9093S	Mount	Permanent Mount For F5 MicroCan, 2 Screws
DS9093RA	Mount	Lock Ring
DS9093RB	Mount	Flange Enlargement
DS9096P	Mount	Adhesive Pad
DS9101	Mount	Multi-Purpose Clip
DS1401	Link	Front Panel Button Holder
DS1402BB8	Link	Button-To-Button Coiled Cord, 2.4m
DS1402BP3	Link	Button-To-Cup Coiled Cord, 0.9m
DS1402BP8	Link	Button-To-Cup Coiled Cord, 2.4m
DS1402BR8	Link	Button-To-RJ-11 Coiled Cord, 2.4m
DS1402RP3	Link	RJ-11-To-Cup Coiled Cord, 0.9m
DS1402RP8	Link	Button-To-Cup Coiled Cord, 2.4m
DS1402RR8	Link	RJ-To-RJ-11 Coiled Cord, 2.4m
DS9092	Link	Panel-Mount Probe
DS9092GT	Link	Hand-Grip Probe With Tactile Feedback
DS9092R	Link	Touch Port, Tabbed MicroCan
DS9092R-C	Link	Touch Port, Tabbed MicroCan With Logo
DS9092T	Link	Panel-Mount Probe With Tactile Feedback
DS9094F	Link	Clip For F5 MicroCan, Through-Hole Solder Mount
SA9094FS	Link	Clip For F5 MicroCan For Surface Solder Mount
DS9098	Link	MicroCan Retainer For Surface Solder Mount
DS9100A	Link	Touch And Hold Probe Stampings, Ground Contact
DS9100B	Link	Touch And Hold Probe Stampings, Data Contact
DS9100C	Link	Touch And Hold Probe Stampings, Data Contact Coiled Spring
DS9097	Interface	Touch COM Port Adapter
DS9097E	Interface	Touch COM Port Adapter, EPROM Upgraded Version

Development Support

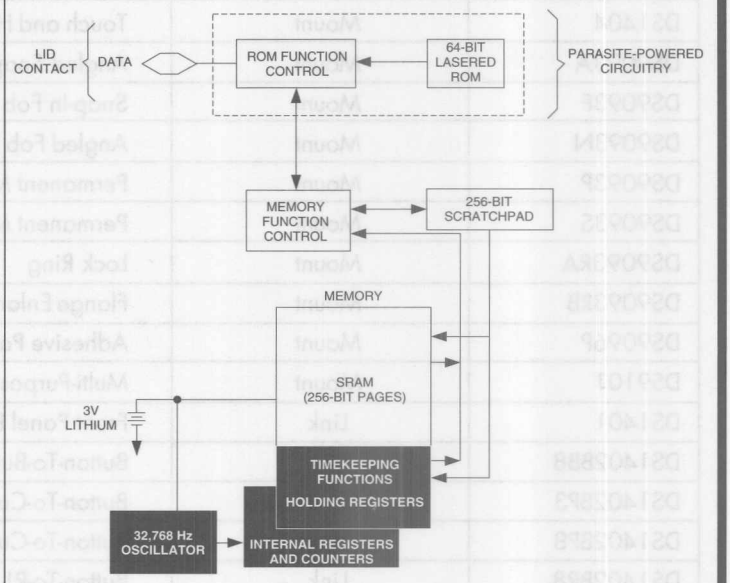
Part Number	Category	Description
DS9091K	Kit	MicroLAN Kit
DS9092K	Kit	Touch Memory Starter Kit
DS0621-SDK	Software	TMEX Professional Software Developer's Kit
DS0630N	Software	TMEX MicroLAN Manager
DS9103K	Kit	Touch Memory Access Control Demo Kit

Functional Block Diagrams

DS1985/6 Block Diagram

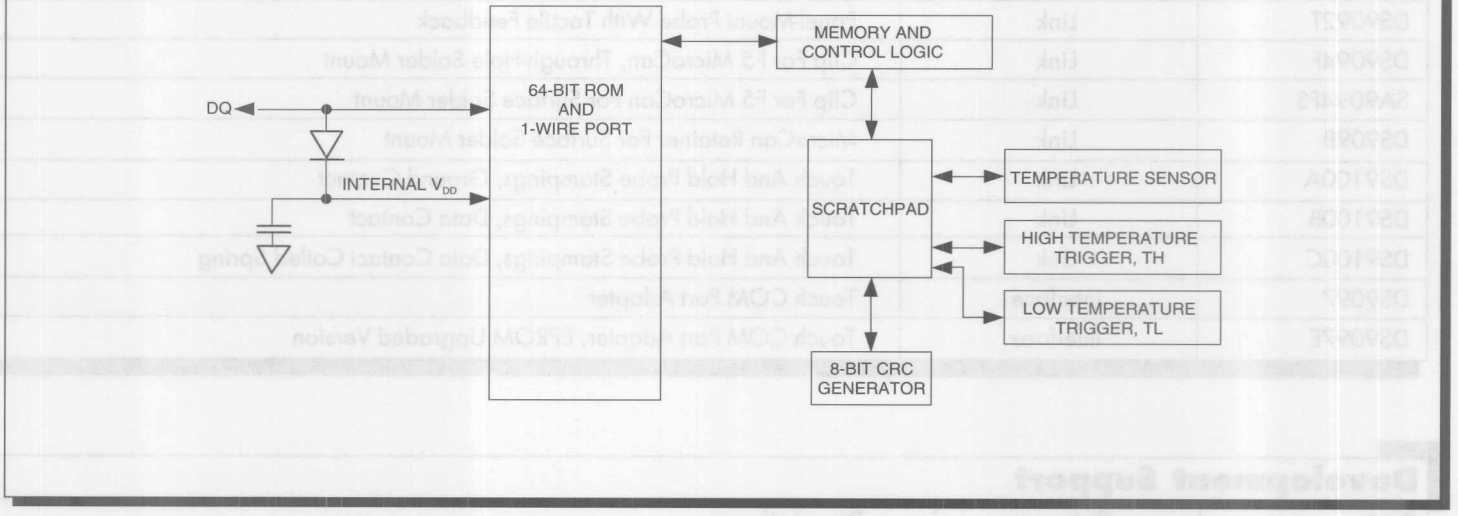


DS199x Block Diagram



NOTE: Black areas only present in DS1994

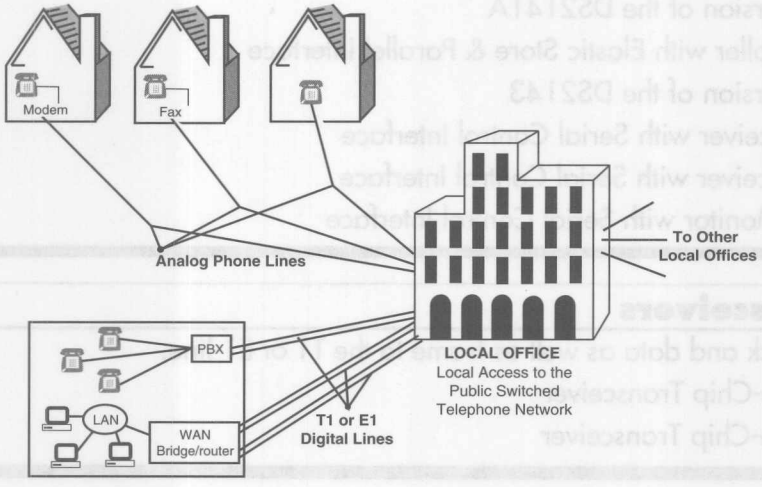
DS1920 Block Diagram



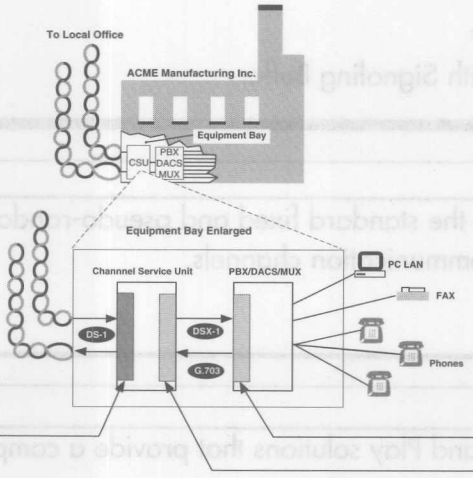
T1 & E1 Digital Connectivity Solutions

T1 is digital transmission at 1.544Mbps. It is transmitted over two sets of twisted pair wire: one for the transmit direction and one for the receive direction. T1 was originally developed to carry digitized voice information. Today T1 is used to transmit voice as well as data and video to large and small businesses. E1 is very similiar to T1 but has a transmission rate of 2.048Mbps. T1 is mainly used in North America and Japan while E1 is prevalent in Europe and in Asia. Dallas Semiconductor offers products that allow users to easily connect to both T1 and E1 networks.

A Typical Network



Where T1 & E1 Products Fit



DS-1 Products

DS2290	DS2180A
DS2291	DS2175
DS2282	DS2176
DS2141A	DS2188
DS2151	DS2143
DS2153	DS2172
DS21Q41B	DS21Q43A

DSX-1/G.703 Products

DS2180A	DS2186	DS2153
DS2181A	DS2151	DS2172
DS2141A	DS2187	DS2282
DS21Q43A	DS2188	
DS21Q41B	DS2175	
DS2143	DS2176	

Selection Guides

Line Interfaces

Function: To recover clock and data from the T1/E1 line and create the waveforms that are driven onto the T1/E1 line; also to remove phase jitter from T1/E1 lines.

DS2186	T1 & E1 Long & Short Haul Transmitter
DS2187	T1 & E1 Short Haul Receiver
DS2188	T1 & E1 Attenuator

Framers

Function: To find the frame, multiframe and channel boundaries in a T1 & E1 data stream and to monitor the T1 & E1 data stream for errors and alarms.

DS2141A	T1 Controller with Elastic Stores & Parallel Interface
DS21Q41B	Quad Version of the DS2141A
DS2143	E1 Controller with Elastic Store & Parallel Interface
DS21Q43A	Quad Version of the DS2143
DS2180A	T1 Transceiver with Serial Control Interface
DS2181A	E1 Transceiver with Serial Control Interface
DS2182	T1 Line Monitor with Serial Control Interface

Single-Chip Transceivers

Function: To recover clock and data as well as frame to the T1 or E1 line.

DS2151	T1 Single-Chip Transceiver
DS2153	E1 Single-Chip Transceiver

Elastic Stores

Function: To absorb the frequency and phase differences between two separate clocks and to rate-convert T1 to E1 and vice versa.

DS2175	T1 & E1 Two-Frame Buffer
DS2176	T1 Receive Elastic Store with Signaling Buffer

Bit Error Rate Tester

Function: To generate and synchronize to the standard fixed and pseudo-random test patterns for the purpose of stressing and testing digital communication channels.

DS2172	BERT Chip

SIP Stiks

Function: Pre-assembled and tested Plug and Play solutions that provide a complete T1 solution.

DS2282	T1 FDL/Monitor
DS2290	T1 Isolation
DS2291	T1 Long Haul

Featured Products

DS2151 T1 Single-Chip Transceiver
DS2153 E1 Single-Chip Transceiver

The DS2151 and DS2153 Single-Chip Transceivers are simply the most advanced technology available for interfacing to T1 and E1 lines. These chips handle all of the complex real-time tasks that are needed to get digital voice and data information on and off a T1 or E1 line.

Key Features

- **High Integration**
  All the circuitry needed to interface to either a T1 or E1 line is contained in one small monolithic device.

- **Flexibility**
  The ability to interface to short as well as long haul lines allows for universal deployment.

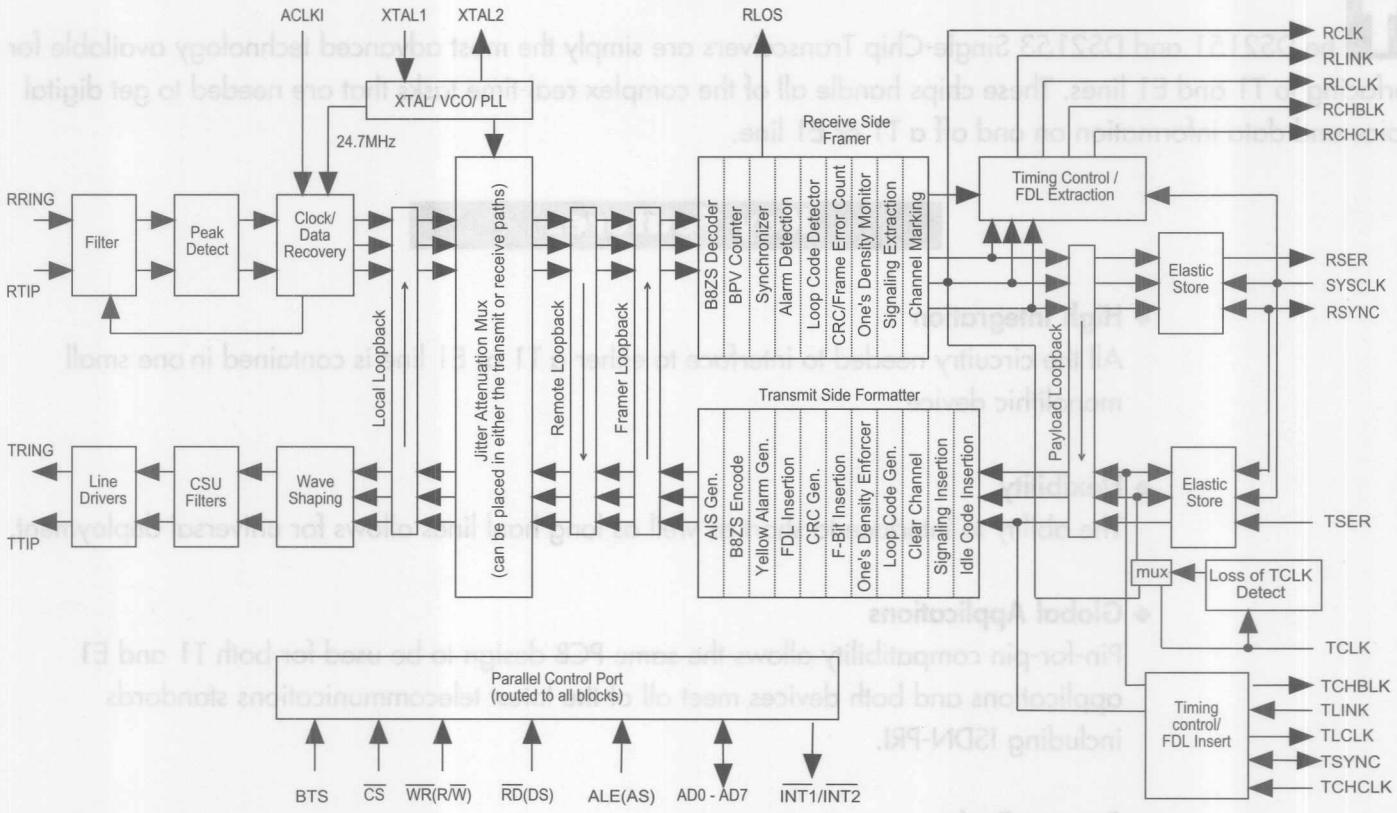
- **Global Applications**
  Pin-for-pin compatibility allows the same PCB design to be used for both T1 and E1 applications and both devices meet all of the latest telecommunications standards including ISDN-PRI.

- **Support Tools**
  Available firmware drivers speed development time and reduce costs. A 24-hour bulletin board and design kits ease the development task.

- **Space Savings**
  A small 44-pin package cuts the amount of PCB space required by up to 65%.

Featured Products

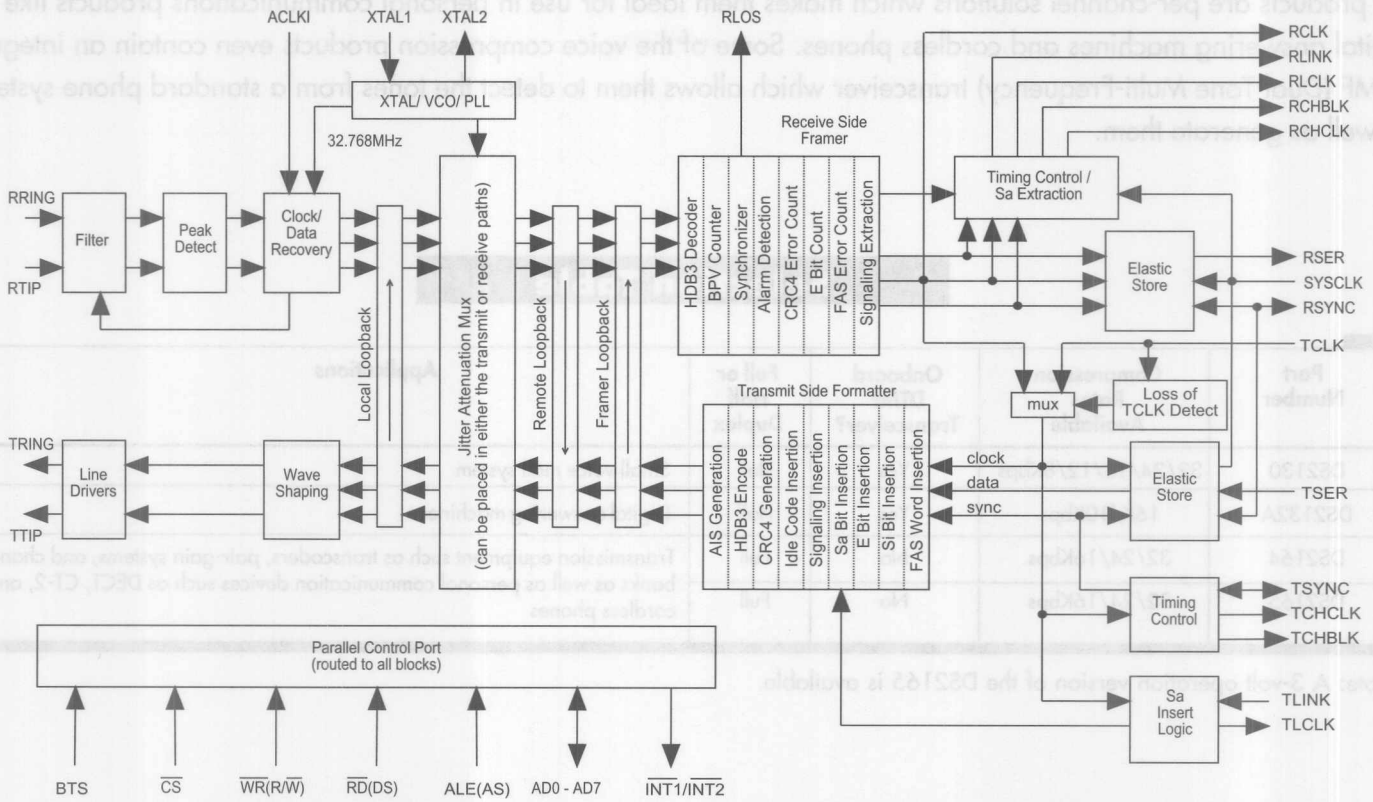
DS2151
T1 Single-Chip Transceiver



Key Features

- Line interface, framer, and elastic stores all combined in one chip
- Line interface can handle both long (6,000 feet) and short haul (655 feet) lines
- Framer supports D4, ESF, and SLC-96 framing formats
- Dual two-frame elastic stores for rate conversion to alternate T1 or E1 clocks
- 32-bit or 128-bit jitter attenuation
- 8-bit parallel control port connects to either multiplexed or non-multiplexed buses
- FDL support circuitry
- Packaged in a small 44-pin PLCC package
- Pin-for-pin compatible with the DS2153 E1 Single-Chip Transceiver

DS2153
E1 Single-Chip Transceiver



Key Features

- Line interface, framer, and elastic stores all combined in one chip
- Line interface can handle both long (1.5KM) and short haul (6dB) lines
- Framer supports FAS, CAS, and CCS signalling, and CRC framing formats
- Dual two-frame elastic stores for rate conversion to alternate T1 or E1 clocks
- 32-bit or 128-bit jitter attenuation
- 8-bit parallel control port that connects to either multiplexed or non-multiplexed buses
- Sa data link support circuitry
- Packaged in a small 44-pin PLCC package
- Pin-for-pin compatible with the DS2151 T1 Single-Chip Transceiver

Voice Compression Products

All of Dallas Semiconductor's voice compression products use ADPCM (Adaptive Differential Pulse Code Modulation) to squeeze u-law or A-law 64Kbps digitized voice signals down by a factor of two to eight. All of the products are per-channel solutions which makes them ideal for use in personal communications products like digital answering machines and cordless phones. Some of the voice compression products even contain an integral DTMF (Dual Tone Multi-Frequency) transceiver which allows them to detect the tones from a standard phone system as well as generate them.

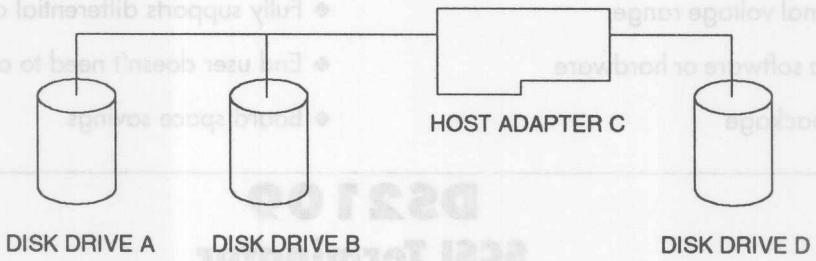
Selection Table

Part Number	Compression Rates Available	Onboard DTMF Transceiver?	Full or Half Duplex	Applications
DS2130	32/24/16/12/8Kbps	Yes	Half	Small voice mail system
DS2132A	16K/10Kbps	Yes	Half	Digital answering machines
DS2164	32/24/16Kbps	No	Full	Transmission equipment such as transcoders, pair-gain systems, and channel banks as well as personal communication devices such as DECT, CT-2, and cordless phones
DS2165	32/24/16Kbps	No	Full	

Note: A 3-volt operation version of the DS2165 is available.

Termination Products

The Termination product family consists of integrated terminator solutions for single-ended SCSI, differential SCSI, BTL, and GTL systems. The DS21S07A, DS2105, and DS2114 provide active termination for nine lines of a single-ended SCSI bus. The DS2108 terminates nine differential SCSI pairs of lines. The DS2112 terminates BTL (Backplane Transceiver Logic) buses, and GTL (Gunning Transceiver Logic) systems. The DS21S07A, DS2105 and DS2108 have a power-down feature that allows the terminators to be used anywhere on the SCSI bus. The DS2109 has an automatic power-down feature that is ideal for Plug and Play SCSI host bus adapters and motherboards.



The terminators on disk drives A and D are powered on, and the terminators on drive B and host adapter C are powered off. When drive D is removed from the system, the terminator on the host adapter C can be switched on via software or hardware.

Featured Products

DS21S07A
SCSI Terminator

Features

- SCSI-1, Fast SCSI, and Ulta SCSI compliant
- Lowest standby current of 3 mA
- Switchable via software or hardware
  - Lowest power-down capacitance of 3pF
  - Lowest power-down current of 100 µA
- 2% tolerance on termination resistors and voltage regulator
- TSSOP and SOIC packages
- Fully supports active negation controllers
- SCSI bus hot-plug support

Benefits

- Compatible with industry-accepted standards
- Power-conscious designs
- End user doesn't need to open system cover
- Maximum current into SCSI bus gives more margin for end user configuration
- Alternative for board space-limited designs
- Compatible with high-performance SCSI systems

Featured Products

DS2108
SCSI Terminator

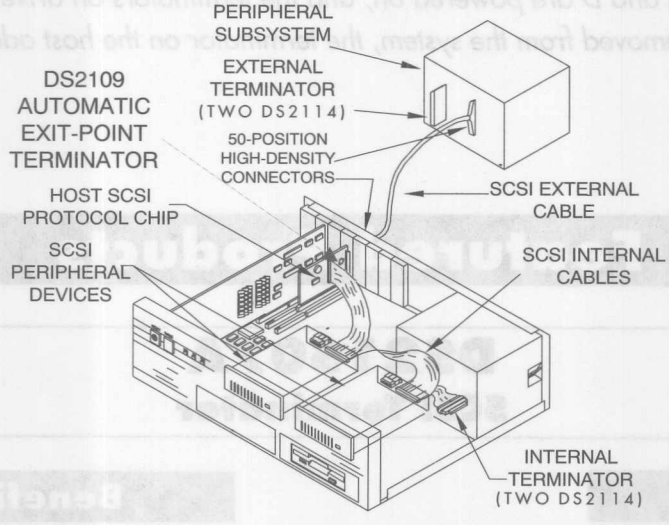
Features

- SCSI-1, Fast SCSI, Ultra SCSI and RS-485-compliant
- -7 to +12V signal voltage range
- Switchable via software or hardware
- 24-pin SOIC package

Benefits

- Compatible with industry-accepted standards
- Fully supports differential common mode voltage range
- End user doesn't need to open cover
- Board space savings

DS2109
SCSI Terminator



Features

- SCSI-1, Fast SCSI, and Ultra SCSI compliant
- Provides active termination for 18 signal lines
- Bus termination sensing and automatic disconnection
- 2% tolerance on termination resistors and voltage regulator
- Low power-down capacitance of 3pF

Benefits

- Compatible with industry-accepted standards
- One-chip solution for Plug and Play SCSI termination
- Functionally compatible with DS21S07A

DS2112
BTL Terminator

Features

- Complies with IEEE 1194.1-1991
- Complies with IEEE 896.2-1991
- Active termination for 8 signal lines
- Precise 2.1V voltage regulator onboard
- 16-pin package
- Package optimized for minimum parasitic inductance and resistance

Benefits

- Compatible with BTL standards
- Compatible with Futurebus+ standards
- Fully supports high switching speeds
- Eliminates specialized 2.1V supply
- Backplane space savings
- Minimizes effects of large di/dt

DS2113
GTL Terminator

Features

- Complies with GTL specifications
- Active termination for 8 signal lines
- Precise 1.2V voltage regulator
- 16-pin package
- Package optimized for minimum parasitic inductance and resistance

Benefits

- Compatible with Gunning Transceiver Logic Standard
- Fully supports high switching speeds
- Eliminates specialized 2.1V supply
- Minimizes effects of large di/dt

DS2105 and DS2114
SCSI Terminator

Features

- SCSI-1, Fast SCSI, and Ultra SCSI compliant
- Lowest standby current of 3 mA
- 150-mil SOIC package
- Fully support active negation controllers
- Tolerance on termination resistors and voltage regulator; 2% - DS2114, 5% - DS2105
- DS2105 switchable via hardware or software

Benefits

- Compatible with industry-accepted standards
- Power-conscious designs
- Compatible with high-performance SCSI systems
- Maximum current into SCSI
- Backplane space savings
- Minimizes effects of large di/dt